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CONTENTS

IR FORCE DEVELOPMENT TRENDS ---- Gen. J. T. McNarney, *USAF* 3
NOW YOUR 'ISMS' ---- Col. T. F. Van Natta, *Cav* 9
HE POLITICAL COMMISSAR IN THE RED ARMY ---- Capt. G. H. Ried, *Inf* 14
L ALAMEIN TO TRIPOLI—AN ARMY IN PURSUIT ---- Lt. Col. H. M. Exton, *FA* 21
HE SUPPLY OF CIVILIANS IN LIBERATED AND OCCUPIED AREAS ---- Lt. Col. R. W. May, *QMC* 29
AC VS. STRAT ---- Col. R. J. Browne, *USAF* 33
IE ARMY AND UMT ---- Col. C. G. Follansbee, *FA* 38
LEGAL ASSISTANCE OFFICER AND ARMY MORALE ---- Lt. Col. J. C. Davie, *QMC* 47
ITARY PSYCHOLOGY—EMOTIONS ---- Chaplain (Major) A. C. Longley 54
S MEDICS ALSO HAVE SUPPLY PROBLEMS ---- Col. S. B. Hays, *MC* 60
TARY NOTES AROUND THE WORLD ---- 63
GN MILITARY DIGESTS ---- 73
The Battle of Kursk ---- 73
Cyprus as a Training Ground ---- 81
Aerial, Motorized and Mechanized Warfare ---- 83
The Crete Campaign ---- 87
Air Transport Organization ---- 91
Technical Education of Officers ---- 98
Technical Developments and the RAF ---- 101
Tunisian Campaign ---- 106
Kamikaze ---- 109

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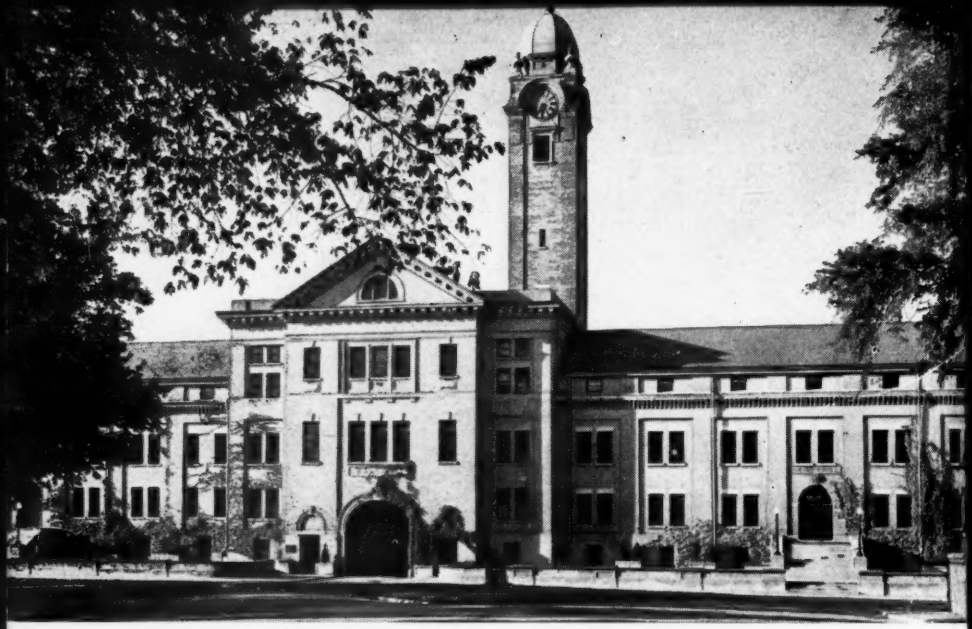

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Air Force Development Trends

General Joseph T. McNarney, *United States Air Force*
Commanding General, Air Matériel Command

General McNarney held many other high commands before taking charge of the Air Matériel Command at Wright Field, Dayton, Ohio, where he is now responsible for research and development, testing, procurement, maintenance, and supply of aeronautical materials and associated equipment required by the United States Air Force. He has served as Deputy Chief of Staff, United States Army; Deputy Supreme Allied Commander, Mediterranean Theater of Operations, and Commanding General of United States Army Forces in that Theater. In September, 1945, he became Acting Supreme Allied Commander in the Mediterranean Theater of Operations, and in November, 1945, he succeeded General of the Army Dwight D. Eisenhower as Commanding General, U.S. Forces, European Theater, and Commander-in-Chief, U.S. Forces of Occupation in Germany. He was appointed Commanding General of the Air Matériel Command on 1 October 1947.—The Editor.

THE adequacy of our Air Force often is considered solely in terms of numbers of aircraft in being and personnel to pilot and maintain them. An equally important factor as a basis for evaluating our true air strength is the effectiveness of our research and development program. There is no doubt that the future of military aviation depends on the solution by our scientific, industrial, and military laboratories of the many urgent research and development problems emphasized by the complex requirements of a new era of flight.

Any comprehensive analysis of all the factors required to bring an adequate Air Force into being should, of course, consider as indispensable to this objective the tremendous and varied contributions made in many fields of endeavor by a wide variety of civilian and military organizations.

While all these factors merit discussion here, this article is intended to cover research and development at the Air Matériel Command, and, because of space limitations, will have to be confined to that subject.

Today, the Air Matériel Command engineering laboratories are devoting their attention to more than 2,800 projects covering both air and ground equipment in the general fields of aircraft and guided missiles.

In monitoring these projects, we must insure as far as possible that the combination of all and the emphasis placed on each maintains the proper degree of balance essential for an effective program in the making, and for a superior Air Force in being.

Our broad mission can be aptly phrased as several distinct problems. They include accomplishing the urgent improvements and advances which must be made in the still vital subsonic field; overcoming the inherent difficulties incident to

piercing the transonic barrier; and solving all the complex problems which must be overcome if we are to succeed in our plans for controllable supersonic flight. At the same time, we are concerned with providing all the necessary related ground and maintenance equipment.

Our basic responsibility, however, remains the same and can be simply stated. Dictated by strategy, tactics, as well as economy, we must design our aircraft to dependably perform specific functions with certain minimum performance standards under widely varied weather and flight conditions. Simultaneously, our research and development efforts required to accomplish greater aircraft performance in speed, altitude, ease of maintenance, mechanical reliability, and all other factors, must be unremittingly carried through to successful fulfillment.

Subsonic Aircraft

It would be well to stress at this point that we are still very much concerned with the subsonic aircraft and its related equipment. Present trends indicate that the subsonic airplane will be with us for some time to come and, in the event of national emergency, must be maintained in a state of full preparedness.

Fundamentally important to this preparedness is the readiness of transport and cargo aircraft of such size and in such numbers as will enable us to move complete divisions of fully equipped ground troops over wide areas in a minimum of time. To this end, we are collaborating closely with the Army in determining characteristics of transport aircraft so that they will conform to Army needs. By the same standard, the designers of Army equipment are devoting considerable attention to aircraft loading requirements.

In the field of aircraft, military characteristics have been established for four types of transports, several types of fighter and bombardment aircraft, three types of training planes, and four types of helicopters. While funds are not available in all cases to translate the military characteristics into development actualities, the types presented will indicate the basic trend in this field.

Briefly touching here on each group, we have included in the fighter aircraft classification the *penetration* type, required for operations well within enemy territory; the *interceptor*, a high speed, rapid-climbing fighter for locality defense; the *all-weather* type; and the *parasite* fighter, designed to be carried in bomb bays, representing a possible approach to the defense of very long range bombers.

Light, *heavy*, and *medium* types comprise the aircraft designations in the bomber field, while in the transport class, our characteristics provide for both a *heavy* and *medium* cargo airplane, with payloads of approximately 50,000 and 20,000 pounds respectively. Smaller payloads, in the neighborhood of 8,000 and 16,000 pounds, are indicated for the *light* and *medium* assault airplanes which may serve both as replacements for medium and heavy gliders and as general utility freight aircraft.

An interesting development in connection with our planned heavy aircraft is an endless track, tractor-type fully retractable landing gear. By reducing "footprint" pressure in making contact on marshy or otherwise unsafe terrain, the landing gear will enable aircraft to operate from fields whose surfaces normally would not support it.

The helicopter, as has been recently publicized through its rescue missions, is assuming considerable importance for operations in inaccessible areas and for short hauls over rivers and mountains, and our military characteristics in this field are aimed at those objectives. Our trainer type characteristics cover a combination primary and basic trainer, the single place jet trainer, and the multiplace jet trainer. In the special research

aircraft field, the XS-1 continues to serve well as a research tool, with other aircraft in this classification already under study and construction.

Engine Development

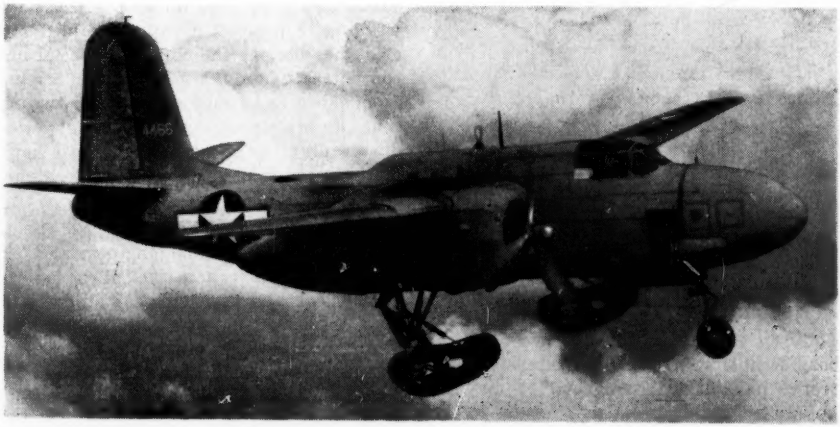
From a propulsion standpoint, considerable technological progress has been achieved during the past few years in the field of aircraft power plants and associated equipment and clearly indicates a trend possibly more apparent than any other—the almost complete transition from reciprocating to jet and turbine engines for high performance aircraft.

Requirements uncovered by the development of these engine types have considerably widened and accelerated our research activities, not only in this one field but in many others necessarily related to it.

In the materials field, for example, metallurgical studies have as their urgent objective the development of alloys and coatings with greater heat resistance for jet propulsion devices. While ceramic coated metals have been successfully used as engine parts, still to be developed for the full utilization of this process is a satisfactory large scale production process which, of course, is an integral factor in the achievement of our objective.

Similarly, a far-sighted policy requires that we pursue laboratory study and experimental work to explore every possibility of utilizing new raw materials and obtaining interchangeable and substitute materials for those in the scarce category or those expected to become less abundant in the event of an emergency. Through intensive research on magnesium alloys, titanium, and zirconium metals, we hope to eventually augment our potential material supplies, but this, as many other of our projects, will be accomplished only after continuous research and development.

Much effort is being expended in many fields to increase the internal efficiency of our turbo-jet, rocket and turbo-prop engine components, to create better refractory materials, and to determine new



In-flight photo of plane with tractor-type landing gear.—USAF photo.

and improved fuels and propellants. We also have already begun, in collaboration with the Atomic Energy Commission and private industry, a probing of all possible applications of nuclear energy to the propulsion of aircraft.

Role of Electronics

The specialized requirements of high speed jet aircraft and all-weather flight, among other factors, have greatly emphasized the role of electronics in our military aircraft and operations of the future. An indication of its importance to an effective, well-balanced program may be obtained from even a necessarily brief analysis of the utilization of electronics by many of our laboratories in their own developments.

In the field of armament, for example, current indications are that radar operated fire control systems which will automatically locate a target offer the best means of protection from enemy aircraft for our bombers as well as the best means for accurate bombing.

All-weather flight, too, depends principally on electronics, and we are devoting considerable attention to an extensive electronic navigational program. It may be noted that highly promising results in the field of long distance navigation already have been achieved with low frequency Loran.

Electronics also is the principal field in which we are working to develop means of controlling and guiding our missiles and pilotless aircraft.

The matter of aerial photography is of considerable moment in our program, inasmuch as the control of long range guided missiles will make it necessary to obtain precision methods of determing long distances and their azimuths. One very important mapping project underway at the present time concerns the application of Shoran to precision mapping in the United States, and electronic devices are being used for triangulation, flight line navigation, and for the measurement of long distance.

Human Factors

Basically important in our research and development is the human factor involved in high speed flight, and it is encouraging to note that distinct progress has been made in the field of aero-medical research during the past year.

The ability of the human body to withstand fairly high acceleration forces of short duration as would occur in emergency escape ejection either vertically upward or downward from a disabled aircraft has become the object of special and concentrated study. Much has been learned from these experiments and from two recent highly successful human ejections during flight at about 260 miles per hour, and we plan to extend such tests to higher speeds.

Much attention and effort are being devoted to our "human engineering" experiments, and exhaustive physiological, biophysical, and psychological, studies and tests to determine man's limitations are in progress with the objective of providing means to overcome them. Similarly, the development of equipment for the safety of air crews has steadily progressed. Explosive decompression has been studied, and men subjected to that decompression at altitudes of 40,000 to 65,000 feet.

Developments in Equipment

In the aircraft equipment field, covering a very wide range of items for both air and ground use, our numerous electrical projects have progressed to a point where efficient, reliable, and lightweight equipment is available to perform most of the numerous functions required in our aircraft. For many aircraft applications, operation at high altitude and at extreme temperature is now more reliable by electrical methods than by pneumatic or hydraulic means.

Considerable progress, too, has been

realized in the field of aerial resupply, and single items of equipment weighing approximately 6,000 pounds have been dropped successfully.

While current standard personnel parachutes are limited for personal safety reasons to operations at speeds under 250 miles per hour, control devices are being developed to automatically operate them only after the wearers have reached a safe operating speed and altitude. At the same time, research also is being undertaken in the design of parachute canopies capable of operating at speeds far in excess of 250 miles per hour without excessive shock.

In the specialized parachute field, it is believed that our early 1947 ejection and parachute recovery of instrumentation from the warhead of a V-2 missile represented the first successful parachute ejection from a missile travelling at supersonic speeds and at ultra high altitude. Scientifically, the results not only paved the way for furthering the measurements of upper air phenomena but proved the practicability of future recovery of instrumentation from high altitudes.

The need for a comprehensive and aggressive upper air research program is one of the fundamental prerequisites to successful high-speed, high altitude flight. For our purposes, we must obtain meteorological data to at least 600,000 feet, and we have launched an intensive, high-priority investigation in this direction.

Turning to the field of navigation for a brief glimpse, we find that, on the basis of presently available service equipment, our navigation is effected entirely by human means—pilotage, celestial navigation, or through the use of both radio and radar. We have hopes, however, that navigation equipment, in the not too distant future, will become more automatic. The 2,400 mile trans-Atlantic flight of a C-54 during which no member of the nine-man crew once touched the controls from takeoff to landing recently emphasized progress along this line.

Guided Missiles

In the field of guided missiles, our research and development program currently calls for characteristics for a complete family of Air-to-Air, Air-to-Surface,

Two hundred thousand amperes of electric current being shot into an aircraft fuselage in an Air Force experiment.—USAF photo.

Surface-to-Surface, and Surface-to-Air missiles. These characteristics, however, do not represent a firm requirement as to minimum acceptable performances, but are more a guide toward which our efforts are being directed. Guided missile contracts are very broad in scope and call for many months of study and research, as a result of which both the contractor and the Air Force have been able to more adequately assess the problems involved and establish the best lines of approach toward a possible and practical solution.

In regard to all our varied and increasingly complex developments, one fact becomes obvious—there can be no finality

to the design or operation of aircraft and missiles until man has reached the limits of his intellectual daring and technical ingenuity. A research and development program, therefore, must be considered as a continuous process even as we consider its successful undertaking as a continuous responsibility for national security.

We must not leave to the future what our sure knowledge tells us to do today. Each year we must maintain in being the military forces that can keep us safe. They must be supplied with the best equipment, armed with the most powerful weapons, and manned by personnel trained to the highest state of readiness. It will take money and men to maintain such forces—but much less of each than it would take to fight another war.

General Carl Spaatz

Aeronautical designers and engineers at Wright Field have been working on other engineering projects, some of them as important to commercial as to military aviation: electronic systems for all-weather flying, precision navigation, automatic, blind landing devices, airport traffic control, the perfection of radar, of rockets and rocket engines.

A tool to speed up this work was captured from the Germans at the end of the war—tons of Nazi documents, blue prints, detail drawings, and microfilm.

Looking toward World War II, Germany for many years had engaged in intensive and extensive scientific research, much of it closely related to that now being done in this country. Evaluation and dissemination of material gleaned from these documents now are major AMC (Air Matériel Command) tasks. The reward should be a reduction by many years in the time our scientists must devote to certain aeronautical problems.

Lieutenant General N. F. Twining

Know Your 'Isms'

Colonel T. F. Van Natta, *Cavalry*
Instructor, Command and General Staff College

WHEN the average army officer attempts to follow international news in the press, he is immediately confronted by an array of political parties, so labelled that they apparently make no sense. There are radical socialists, social democrats, socialist republicans, and just plain socialists. To add to the confusion, the USSR which everyone accepts as communist, calls itself the Union of Soviet Socialist Republics. What is the difference, if any, the troubled reader wonders, between socialism and communism? Both seem to involve restrictions of private ownership, yet socialists and communists do not always seem to get along together. There is the fascist, that term of opprobrium that is so freely hurled by any and all at each and sundry: what is fascism? Finally, there is capitalism the big fat man with the money bags. The United States is frequently called "capitalist." Is it?

To attempt to describe or define the reasons for the labels of the current political parties of the nations of the world is an impractical, nearly impossible task. It is a task that could never be completed, for politics change, and while one group will change its label each month while pursuing the same ideals, another will cling to its traditional label, but will radically alter its aims and beliefs. To keep abreast of the politics of the more important nations of the world is a full-time job for a specialist, or several specialists. What is important to the average reader, though, especially in the troubled world of today, is to understand the meaning of the various major "isms."

So, in order to clear out the underbrush that obscures our perception of the individual trees that make up today's political forest, an elementary, theoretical definition of these "isms" is offered.

Capitalism

We start with capitalism as it is the "ism" that, according to a large number of people, permeates the attitude of the United States toward life. Most Americans vigorously deny that we are capitalists, quoting their own status of being just one jump ahead of the finance company. This average conception of a capitalist, someone with a large sum of money in the bank, is wrong; at least it is not the definition the books give, nor the idea that is included in the word when we compare it with the other "isms."

To understand the academic meaning of capitalism, we must first go back to the economist's definition of capital. This definition is not "money," as is so commonly believed, but any material or machinery that can produce goods, food, services or wealth. Thus, land is capital. A factory is capital. An apartment house is capital. Money in itself is not capital until it is invested or otherwise used to produce wealth.

By extension, public services are also

considered as capital, meaning any service that affects a community or group as a whole, as distinguished from private services, which are a matter of concern only to different individuals at various times. Public services include power, heat, light and water, and all forms of public transportation. They also include education, housing, sanitation, medicine, banking, and, of course, the legal system and its enforcement.

From this we step to capitalism: a system in which capital (as defined above) is owned and controlled entirely by individuals for their own ends. And, of course, a capitalist is anyone who owns and operates any thing or service that produces wealth. A taxi driver who owns his own cab is a capitalist, just as is a farmer who owns his own land, an insurance policy holder, or anyone who has a bit of money put away in stocks or bonds.

Finally, it is important to note that the capitalist doctrine does not specify anything about the government. Theoretically, capitalism can exist equally well under almost any kind of government, and to call a man a capitalist does not necessarily classify his political beliefs.

To repeat, capitalism is the doctrine of private ownership and operation of the means and materials for producing wealth.

Socialism

Socialism is opposed to capitalism in that the former advocates a system in which ownership and operation of all capital, all means of production of goods and public services, will be exercised by and for society itself.

This is sometimes phrased as "collective ownership of capital," but it means the same thing; the individual cannot own or control anything that produces wealth.

Here is where the average person labors under a misconception: the popular opinion that in a completely socialized state no one can own anything. This is not so at all, according to basic doctrine. Any individual can own a fine home, but he cannot rent it to someone else; he can own as many automobiles as he wants, but he cannot haul paying passengers in them. He can own anything, provided it is not utilized as a source of income.

This is the big and essential difference between capitalism and socialism: under pure capitalism all capital is owned and operated by individuals for their own benefit, under pure socialism all capital is owned and operated by and for society itself.

The other big misconception is that socialism implies dictatorship. Again, this is not so at all, according to basic doctrine. Socialism merely specifies what shall be owned and operated by society; it makes no attempt to specify how this ownership and operation shall be handled. Exactly like capitalism, it can, theoretically, exist under almost any form of government.

Hitler's Germany, claiming to be socialist, was a ruthless dictatorship; England and Sweden, both much more socialist than Germany ever was, are among the best examples of democracy.

Communism

Communism is not a system of ownership or control of wealth, but rather an ideal condition, to be reached by certain methods. A comparison can be found in almost any religion, where "heaven" is an ideal condition to be attained by the individual who, by practicing and observing a certain system, so improves his soul that at some indefinite time in the future he will find himself in "heaven." Making the obvious changes in terminology, *communism* is an ideal condition to be attained by society which, by practicing and observing a certain system, so improves its *social consciouness* that at some indefinite time

in the future this society will develop into *communism.*

The principal characteristics of a society that has attained pure communism are:

Production of everything is ample to provide all that anyone wants.

Each individual will be educated in social consciousness to the point where he or she will not take any more food, goods, or services than can be used, and will, without being told, automatically do a full day's work for society.

Government will have disappeared, as there will be no need for controls of any kind. Only a few routine administrative functions remain.

Money will have disappeared, because, with production ample in every respect, individuals merely take what they want. No pay is rendered for services, since everyone performs a task without compulsion.

The question of "private property" will have been forgotten, for with plenty of everything for all there is no need to save or protect what one has.

When the entire world has attained pure communism there will be no more wars for all wants are satisfied; there are no governments to raise issues, and each individual is engaged in a socially-necessary task.

Although communism itself, like heaven, is not a system, there is a very definite system outlined for reaching this pure state. It begins with the conception that no capitalistic system will permit communism, hence capitalism and its supporters must be destroyed. That is the "world revolution" we hear so much about, the elimination of the opposition.

The next premise is that the "army" to fight for this revolution must be generally recruited from the bottom of the economic scale, for anyone who is a capitalist, or has been successful under the capitalistic system, will oppose a communist state. Only those who, according to Marx, "have nothing to lose but their chains" can be relied on as soldiers of the revolution.

With opposition to the idea of communism eliminated, the next step is the establishment of a completely socialist system. This is to provide a period of education, in which production is built up to where it is ample in all respects, and the social consciousness of all individuals is developed to the point where each and every one performs a task without compulsion, and consumes only what is needed.

For this period of education, a definite form of government is prescribed: "dictatorship by the proletariat." "Dictatorship," because the government must be absolute, must have the power to enforce its measures for ample production and to eliminate opposition or non-cooperation; "by the proletariat," since this is still the only class considered trustworthy.

No one has ever hazarded a guess as to how long this dictatorship must endure in point of time. As long, and only as long, according to Marx and the communist leaders, as it is necessary.

It will be noted that to the socialist, socialism is the end to be attained. To the communist, however, socialism is merely a tool to be used in educating society to where it develops into communism. Under socialism the state exists as the very core of society; in the communistic condition the state has disappeared.

Fascism

Capitalism and socialism are political theories that have been carefully studied and developed over a considerable period of time. They are methods of social organization that have been adopted, in various degrees of completeness, by many groups. Communism is not a political theory nor

a method of organization, but an ideal to strive for.

Fascism is none of these. The word was adopted as the label for an Italian political party led by Benito Mussolini, exactly as our labels "republican" and "democrat" were adopted. Mussolini preached a return to the virtues of ancient Rome, especially obedience to the state. A symbol of authority, and hence of obedience, in the Roman Republic, was the "fasces," the bundle of rods with an axe in the middle. Mussolini's party adopted the fasces as their trade mark and with it the label, "fascist." The true political doctrine of the fascist party can best be described as limited capitalism strictly controlled by a dictatorship.

Fascism never developed into a full-fledged political theory; at most it can only be taken to include Mussolini's theories of government. But Mussolini was not much of a theorist; rather he was what we call an "operator," so fascism is still left without a theory. When Mussolini and his principal cohorts fell into international disrepute, the term "fascist" became a name that could be applied to any government group that was heartily disliked, especially a group that maintained or aspired to power by force. In this respect both the Nazis of Germany and the Bolshevists of Russia could be called fascist, although they themselves reserved this term for their worst enemies.

Current Practices

So, in conclusion, our next interest is in practical application. This can best be achieved by examining some examples that are current today.

First, capitalism: It is doubtful if anywhere on the earth there is a completely capitalist system. The United States is frequently called the leader of capitalist society, yet even we do not have pure capitalism. True, nearly all production is in private hands, but our public services have a fair amount of socialist control. Our postal system is owned and operated by society; our law-enforcement system is operated by society; our public health system is operated by society. Many other public services are completely or partially owned and operated by society, such as our highway system, our educational system, our rivers and harbors and our electric power system.

From the United States, at the capitalist end of the scale, we run through varying mixtures of capitalism and socialism. An increasingly large number of nations have socialized their transportation system, their communications systems and their public utilities. In a lesser number of countries the exploitation of all subsoil wealth has been socialized, and in a still smaller number, society has entered the manufacturing field.

The USSR is at the completely socialist end of the scale, though even here some extreme socialists will question the completeness of Russian socialism. And remember that the USSR is socialist only as a matter of convenience, not because it considers this to be an objective. A socialist is one who believes that capital should be owned collectively and operated for the collective good. A communist is one who believes in the eventual stateless, propertyless, ideal condition where production is ample and social-consciousness perfect. The socialist is frequently willing to try socialism by democratic methods, but the communist is unswervingly faithful to the three prescribed steps: world revolution to eliminate the opposition, proletarian dictatorship to educate society, and communism.

There is still considerable divergence of opinion on just what constitutes true socialism, a situation that is paralleled in religious thinking. There is little argument over the basic definition of a "Christian," but there is considerable difference

of opinion as to just how Christianity shall be practiced. So it is in socialism. Most students are agreed on the basic definition, but there are as many schools of thought on how socialism should be practiced as there are sects in the Christian religion. A major source of difference is the distinction between public service and private service. Another is the form of government necessary to operate a socialist society, with democracies and dictatorships having their adherents. This is the reason for the many qualified-socialist political parties, and as long as men continue to think, these differences will continue.

At this point it might be well to examine the more common political arguments currently advanced by supporters of capitalism and socialism.

The capitalists say that: *a.* Capitalism cannot exist under absolute dictatorship, hence it must be and is democratic in principle. *b.* Though capitalism allows the individual free rein, it will not be a detriment to society, for no individual can disregard society in his dealings, and every individual learns that a poor, ignorant or unhealthy society brings a poor and unhealthy economy. *c.* Only the stimulation of free enterprise can bring about great social and economic advances. *d.* The rigid and far-reaching controls required by socialism must entail dictatorship.

The socialists say that: *a.* Capitalism inevitably places control of society in the hands of a few. *b.* Since under socialism all production is by and for society, it is inevitably the most truly democratic system. *c.* Since capitalism exalts competition, there must be a loser as well as a winner, hence one part of society, usually a minority, exploits and abuses the other, the majority.

There is, and there has been in recorded history, no example of pure communism. Certain primitive societies, in regions where nature is extremely lavish, have had no preoccupation with the struggle for existence and, as a consequence, have closely approached communism. But with the advent of civilization, new tastes and desires are introduced, "production" is no longer ample, and capitalistic tendencies appear.

Of fascism there is no true copy of the original political party. Taking the word in its broadest meaning, however, we can find fascists and fascism in nearly every social or political group in the world. In essence, their doctrine is the simplest (and most ruthless). Democracy is inefficient, socialism is impractical, society is childish and ignorant. What is needed is someone to run things. The majority will not like it, but neither do children like discipline.

These are your 'isms.' As was said at the start, this description is not complete, nor because of its incompleteness, is it strictly accurate. There are no deviations permitted in communism, and fascism, being merely a nasty name, is indefinable. Capitalism and socialism, however, with all their many and varied adherents, have many facets, many supporters and many definitions. Anyone interested in the complete theories underlying the two doctrines is urged to read further and form his own opinions.

The Political Commissar *in the* Red Army

Captain George H. Ried, *Infantry*

THE Red Army* and the political commissar were joined together at birth and will be separated only at the grave. The urgency of the commissar's mission and the role itself has changed through the years, but the philosophy has remained and should be examined to determine whether it is a weakness or a strength.

During the revolution of November 1917, the Bolsheviks, faced with both civil war and wars of intervention, were forced by expediency to use the former commanders who had served under the Czar as the nucleus of their own officer corps. Common sense, and a natural suspicion on the part of Lenin and Trotsky, dictated that some form of check be applied to the initiative and independent decisions of these commanders. Being opportunists, themselves, the Bolsheviks knew that temptation would rear its ugly head many times before the final Red consolidation had been accomplished. So the office of the political commissar was born, later to be called military commissar, and most recently *war* commissar.

Under Kerensky

It is of historic interest to recall that Alexander Kerensky had used a small group of commissars during his brief tenure as head of the Provisional Government. However, their job at that time was strictly one of spying and gaining information of any and all activities which might be construed as opposed to the interests and objectives of the Kerensky Government. As a matter of fact, it was through one of these commissars that the plot of General Kornilov was exposed. It will be interesting to note the increase in stature attained by the war commissar of today over his furtive and unobtrusive brother of earlier days.

Leon Trotsky was given the job of reconstituting and organizing the Red Army and he began by setting up a uniform type of military administrative office in each township, county, province or district that was under the control of the Soviet Government. Each of these offices was headed by three functionaries: a military specialist, drawn from among the personnel of the "old army," and two commissars for military affairs. These latter were selected for their political affiliations and reliability from the Soviet point of view.

Aura of Suspicion

Each office had two commissars. It is not clear why two were considered necessary, unless they were to watch each other in addition to watching the commander. The aura of suspicion hung over the institution of the commissar from its inception.

Even in those days of infancy, Trotsky attempted to draw a line between what

*The term "Soviet" has recently superseded the term "Red" as applied to the Army, Navy, and Air Forces of the U.S.S.R.

was within the scope of the commissar and what was not. This is the crux of the entire problem and its implications will be noted throughout later developments. If a clear line cannot be drawn, then a continuous conflict between commander and commissar is a foregone conclusion. Events of the last thirty years have proved this to be true, and in a large measure these events have been responsible for the prominence this difficulty has received in high Soviet circles. Human nature is similar throughout the entire world; the Russian commander is undoubtedly as jealous of his prerogatives as any other officer, and a communist informer leaning over his shoulder would naturally upset him.

D. Fedotoff White, in *The Growth of the Red Army*, points out that it was Trotsky's order that the last word should be left to the military specialists in all purely military matters. The political commissars were also instructed not to interfere with operation orders of the military specialists, and that their right to cosign orders merely meant that the given order was not a counter-revolutionary device.

An order of 6 April 1918 stated that the commissars were not responsible for the expediency of purely military operation orders. They had no right to delay the execution of an order even if they disapproved of it. They would only report their disapproval to the next superior military body. There was the usual exception—operation orders suspected on definite grounds of being motivated by counter-revolutionary tendencies.

Duality of Command

As Leland Stowe, in an article on *The Evolution of the Red Army*, puts it, the commissars during the Civil war and the years following were primarily political "security officers who propagandized for the communist theology." The inherent weakness of duality of command is emphasized by the fact that at its inception there was an immediate and almost continuous attempt made to put checks on the commissar and to keep him out of the purely military side of the army.

On the other hand, a resolution of the Fifth Congress of Soviets on 10 July 1918 states that "the military commissars are the guardians of the close and inviolable internal bond between the Red Army and the workers' and peasants' regime as a whole. Only irreproachable revolutionaries, staunch champions of the cause of the proletariat and the village poor should be appointed to the posts of military commissars to whom is handed the fate of the army." Thus from the very beginning there were two divergent schools of thought, a condition which existed well into World War II. Its final compromise today is only a matter of opinion.

One of the first things that the commissars had to accomplish was the removal of antagonism between the Red soldiers and the "old army" officers who were appointed to command them. This was a nasty job and did not add to the popularity of the commissars among the troops. It entailed a great deal more than the simple explanation of political theories. The Russian soldier of 1918 was tired, ill-fed, ill-equipped and undisciplined. On one occasion when a commissar attempted to lead the men into battle he barely escaped assassination.

Commissar's Powers

Similar situations made it necessary for the issuance, by the Central Soviet Authority, of instructions pertaining to the protection of the commissar. His person was declared to be inviolate and an insult offered to him, while on duty, was proclaimed equal to the most heinous crime against the Soviet Government. The Eighth Congress of the Communist Party in March 1919 added to this by granting commissars the right to inflict summary punishment, including arrest, and the right to bring offenders to trial.

The tendency to strengthen the position of the commissar was not unsound at that time. Things were in chaos and war was the by-word throughout almost the whole of Russia. The commissars kept the Red Army intact and were directly responsible for helping to make it an effective fighting force. They compelled obedience and discipline, through one means or another, without which no army can ever hope to succeed. Voroshilov, in a speech delivered at the Eighteenth Congress of the Communist Party in 1939 supports this opinion: "Without the military commissar we would not have the Red Army."

Two conclusions may be drawn from this early period. First, due to the exigencies of the situation, the early commissars carried a great deal of weight and received the unequivocal and unquestioned support of the Red Government. Second, that the military problem of the duality of command was not objected to at first by the officers or the general staff but this situation was to become more complex later.

The "iron hand" of the commissar was vitally needed to spur the Red troops and to shake them from the lethargy into into which they had fallen after the many crushing defeats inflicted on them by the German Army. The influence they wielded was effective and in that lies their vindication. The second conclusion deserves closer attention because of later developments in the relationship between the commander and the commissar. The reason that the officers did not object to the duality of command in the early days of uncertainty is painfully obvious. The Bolsheviks were very impatient, and the slightest indication of balkiness on the part of an officer was liable to cause an abrupt halt to his army career and to his personal well being.

Role Between Wars

Turning from this brief period of the revolution to a study of the role of the commissar between the two World Wars, we see that a continuous struggle took place between the commanders and the commissars for and against the unity of command system. The military men, of course, believed that whenever a unit had two co-equal leaders a diversion and split was inevitable. Both White, and Walter Kerr in his book, *The Russian Army*, agree that the commissars wielded extraordinary power. They had the complete right to countersign all orders and the orders were invalid if the commissars refused to sign.

This had the psychological effect of sapping certain precious qualities of the commanders, *i.e.*, the willpower and ability to make immediate and independent decisions. This is an intangible quality which anyone familiar with command functions during combat will readily admit as vital and essential. Military leaders fought the dual command theory at every turn, cognizant that it would eventually, if not immediately, lead to divided responsibility and inefficiency.

The Red Army slowly gained the ascendancy in its struggle with the politicians and the trend toward "unity" was followed up to the very beginning of the violent purges of 1937. This contention is supported by a quotation from the Red Army Manual of 1926, which describes the duties of the commissar as "the guidance and immediate execution of party-political work, as well as assuring the training and education of the personnel in the spirit of close solidarity and communist enlightenment."

Represented the Party

The commissar was to be first of all the direct representative of the communist party in the Red Army. It must be remembered that the troops were not fully aware of the benefits they were reaping under this new regime, and it was necessary for the party to indulge in some

sales talk. The duties of the commissar, above the regimental level, had to do mostly with matters of policy and with assuring those above him that matters were progressing in good order.

On the regimental level the commissar was engaged in six main enterprises: assistance to the various commanders in maintaining discipline; organization of studies in politics as well as general enlightenment, hygiene, military science, and guidance of soldier discussion circles; a certain amount of political work among the local civilian population; direction of the work of committees of economic assistance; rendering help to Red Army personnel in improving their standard of living; and accepting complaints and depositions of personnel of the regiment. This imposing and assorted list of duties is perhaps one reason why Leland Stowe calls the commissar a combination of army chaplain, educational director, propagandist and efficiency expert.

On the company level, the commissar was responsible for the political education and training of the soldiers in his company. He also looked after the mobile library, propaganda wagon, and assisted the company commander in matters of training and education. It is interesting to note that these "junior commissars" were responsible to the regimental commissar in political matters and to the battalion commander in matters pertaining to military service. They were completely independent of the company commander. Company commanders later could assume dual functions, if they were party members, and thus achieve unity of command. In cases of this kind they were given assistants to aid in the political part of their mission.

Commissar Ranks

A decree issued by the Soviet Government in September 1935 established nine graduated ranks corresponding to those of the commanders. They were the Junior Politruk (Politruk meaning Political Instructor), Politruk (Company, Squadron, etc.), Senior Politruk, Battalion Commissar, Regimental Commissar, Division Commissar, Corps Commissar, and Commissar of the Army (First and Second Rank).

The home of the School for Commissars was in Moscow, and the course covered a total of some 780 hours, taking approximately four months to complete. The curriculum was divided into four main subjects: political instruction, tactics, weapons, and allied military topics. The hourly breakdown was 150 hours for political instruction, 220 hours for tactics, 182 hours for weapons, and the remainder (228 hours) for general military subjects.

The commissar candidates' day began at 0500 and was made up of ten hours actual work, exclusive of the time spent in eating, sleeping or recreation. Four hours were spent in practical training, four hours in theoretical study and two hours in purely political education. It is obvious from this schedule that the graduated commissar was not heavily overbalanced on the political side, and, depending on his will to learn, he could make himself a technically qualified commander of troops.

During the 1920's it is possible to trace less, the transition to the unity of command to the sounder unity system, with a commander as the complete boss and unhampered by the hot breath of the commissar against his neck. Nevertheless, the transition to the unity of command system was slow and cautious. As White expresses it, there was always fear among members of the communist party of so-called Army syndicalism under which the Army would regard itself as an autonomous body with its own laws.

It is not presumptious to suggest that the old party members remembered that they came into power through violence, and that as long as they could control and have the Red Army thoroughly in-

doctrinated, their position would be secure. Another reason for caution was the fact that those who were in control of the military policy of the Soviet Government were anxious not to antagonize the party members who were influential political commissars.

The Red Army constitutes a source of great strength within the Soviet Union, and in a crucial moment it could mean the maintenance or fall of the existing regime. Stalin, himself, is hesitant about letting the Army untangle itself from the civilian or political web in which it is enmeshed. The Army itself realized that discretion must temper its desires for speedy accomplishment of the unity of command.

Unity of Command

The following table taken from White's book helps to consolidate and clarify our thoughts. It is a picture of just how this transition was taking place. The percentages shown indicate the proportion of commanders who enjoyed unity of command.

	April 1925	*January 1926*	*September 1926*	*March 1928*
Corps Commanders	41.1%	70.6%	82.3%	100%
Division Commanders	14.3%	48.3%	54.7%	71.9%
Regimental Commanders	35.8%	37.8%	38.6%	53.6%
Company Commanders	—	18.5%	Sept. 1927 37.7%	41.7%

It may be noted from the above table that definite progress was being made, at least in terms of the theory of unified command. This change in policy—for a change it definitely was—did not pass unnoticed or unheralded.

The opposition forces immediately called out that this was the first step toward Bonapartistic adventures on the part of a military clique. The political personnel of the Red Army were zealous in their attempts to uncover any hint of subversive activity and their operations became more intensive as their fears of this changed policy grew. The commissars devoted considerable time to watching the political trends among the rank and file of the Red Army and, to put it bluntly, were in part at least, political spies.

Political Activities

The commissars censored all outgoing mail and even made up a form letter which contained stereotyped material for home consumption. They conducted many discussion periods, which were a compulsory part of the soldier's training, and made a systematized study of the questions asked at each meeting. Then, too, the political instructors would ask specially selected questions, watch the reactions of the men, and record their answers. The philosophy behind this technique is loathsome to any normal American and contrary to all concepts of democracy. The failure to trust breeds distrust "per se" and will only create a continual battle, sub-surface or above, between the real military leaders and the political instructors.

To further complicate matters, although unit of command won on the surface, disputes in matters of political work, between commander and commissar, came before a political and not a military organization. Completely impartial decisions may have been the rule, but it is extremely unlikely.

Another feature which illustrates the tenacious hold of the politicians was the fact that political representatives were on the promotion boards. It is quite safe to say that unless the commanders were on good terms with the commissars their chances of promotion were very slim.

In spite of the setbacks which the unity of command theory was suffering, it had made some progress and would undoubtedly have made more except for one thing—the great purges in the army in 1936-37. The causes for the purge along with the various ramifications are not within the scope of this article. However, suffice it to say that the purges not only destroyed many officers but also destroyed the theory of unified command.

Increase in Commissars

During the witch-hunt carried on in these years, the commissars did much service for Joseph Stalin in ferreting out those who wavered from the Stalinist line.

The position of the commissars after the purges shows a complete reversal from the trend toward unity of command. Some indication of the new condition may be evinced from the fact that K. Voroshilov in 1939 in his book, *The Red Army Today*, pointed out that on 1 January 1934 there were 15,000 political workers, while in March 1939 the number had increased to 34,000. On 10 May 1937, the institute of military commissars was reintroduced in all units from the regiment up, as well as in all staffs, service units, military schools and training centers. This was to be put into effect regardless of whether the respective commanders were in the single command category or not.

In addition, the commanders and the commissars were declared co-equal, and the politruk declared co-equal with the company commanders. This had a far reaching effect on the morale and state of mind of both the officers and men in the Red Army. It is questionable, even to the present day, whether the effects have been completely eradicated.

The first real test of the entire system took place during the Russo-Finnish war, which began in November 1939. A Russian major is quoted by Walter Kerr as saying after the battle of *Suomussalmi*, that there are "good commissars and bad ones." This in itself is a half admission that something is wrong. Leland Stowe, who was with the Finnish Army during this period, puts his finger on the trouble when he says that the commissars were too zealous in insisting on rigid control over strictly military decisions. This policy was one of pure reaction, resulting almost directly from the purges of only two years before. It was contrary to the system inaugurated by Leon Trotsky during the early period of the Red Government.

Modifications

The modifications and changes which followed immediately after the conclusion of the war indicate a basic weakness in the duality of command, a fact which was also clear to Marshal Timoshenko. In May 1940, he introduced a single command principle, general and admiral ranks, obligatory saluting of officers by soldiers, and a new disciplinary code. This was followed during the first week of German invasion by clarification of the function of commissars. The Presidium Council issued a decree on 16 July 1941, which specified their functions, based on Stalin's conception, namely, "if the commander is the head of a regiment, the regiment's commissar must be the father and soul." The emphasis was placed on building morale and listening to grievances. The commissars could still countersign orders but were specifically advised not to. They were urged to appear in the front lines and on the battlefield, and to conduct critiques after the fighting was over. They were all handpicked men, and, according to Kerr, the men in the ranks throught they did a good job.

This was still not the solution, and even though countersigning was not used very often, the troop commanders nevertheless objected. About the time of the first great winter offensive, in the fall of 1942, unity was not only a desirable factor but an imperative one. In October 1942, the final break came. The dual command system was discontinued. Under the new set-up, the commissars had no command functions whatsoever, and in the words of Walter Kerr were a "sort of deputy chief of staff in charge of political work." In a Soviet Government order, 200 commissars became regimental commanders, and 600 became battalion commanders.

End of Dual Command

When the dual command system was finally removed, speculation was rife as to the full implication of such a move. Evidence of a general nature can be found and distorted, depending on what the writer is trying to prove. However, whatever the long range philosophy, the immediate and practical reasons were those set forth by Leland Stowe in October 1943.

The primary reason was the heavy loss of officers which took place during the first great German offensive. The heavy losses are factual and need not be disputed, and the commissars were a unique and readily available reserve officers pool. They had taken part in many decisions and had sat in on high conferences of strategy. It was very soundly decided that three to six months training in officers' schools, for the most capable, would result in highly-trained and well-seasoned officer replacements.

The second reason was that the Soviet Government was preparing to launch its first great and complicated offensive. Stalin and his general staff were fully cognizant of the fact that the officers would perform at peak efficiency only if left free to make independent decisions, without the psychological shackles that the presence of a commissar of equal power created. This was to be the greatest test the Red Army had ever been called upon to face, and Stalin decided that the risk involved in the application of a dual command system was too great a price to pay for added security.

The fact that the unity command tradition was reintroduced by Timoshenko and fully reinstated prior to the winter offensive of 1942 is an indication of the admission of an inherent weakness in the old commissar system, a weakness brought to its full bloom during the pregnant days of total war. When a commander's ability to make independent decisions is undermined by any outside influence, then he becomes a less effectual commander and should be relegated to a job where decisions are made for him. As the science of war and mobile conflict is intensified, it puts a greater strain on the individual initiative and self-reliance of each member of the officer corps.

Commissar's Role Today

What is the commissar's role today? What will his influence be tomorrow? Both of these questions are largely answerable only by conjecture. The writer's opinion follows the line of thought of L. Mekhlis, First Rank Commissar of the Army, Assistant People's Commissar of Defense, and Chief of the Political Administration of the Worker's and Peasant's Red Army. In speaking to the Eighteenth Congress of the Soviet in 1939, Mekhlis called the commissars the "keen-eyed sentinels of the Stalinist Central Committee and the Soviet Government."

The war commissars will resume a measure of their old prestige during peacetime. They paid "big dividends" in 1917 and 1937, and the young and energetic Red Government is fully aware of its debt to these disciples of Joseph Stalin. They may assume a new name and a varying role, but until such time as complete faith and trust permeates the entire Red Government, they will be an integral part of the Red Army's organic make-up. In other words, these Communist "watch dogs" will be around for many years to come, stronger in peace than in war, but ever-present.

EL ALAMEIN *TO* TRIPOLI

—An Army in Pursuit

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Introduction

THE best way to emphasize the principles or techniques employed in any tactical operation is by historical illustration. History is replete with examples of pursuits. Some were successful and some were not, and the results were usually due to the proper or improper application of the basic principles. These basic principles have not changed through the years. Only their application has changed with new developments in weapons and equipment which have produced such maneuvers as amphibious or vertical envelopments, flanking naval gunfire, tremendous air bombardments, and very rapid movement of armored forces.

One of the finest historical examples illustrating the principles of the pursuit is the advance of the British Eighth Army in 1942-43 from El Alamein to Tripoli.

By late June 1942, German Field Marshal Rommel's *Afrika Korps* had forced the withdrawal of the British Eighth Army to a position in the vicinity of El Alamein bounded on the south by the Qattara Depression and on the north by the Mediterranean Sea (see Map 1). The situation became generally stabilized, with both armies being depleted and exhausted. During the month of August, the opposing forces prepared defensive positions and made strenuous efforts to build up strength in personnel, matériel, and supplies. It was also at this time that General Sir Harold R. L. G. Alexander assumed command of the Middle East, and Lieutenant General Bernard L. Montgomery assumed command of the Eighth Army. These two commanders believed in offense rather than defense and immediately initiated plans for an attack which would completely end the Axis threat in Africa. It soon became apparent that Rommel could not build up strength as rapidly as could the British, and that if this unbalance continued for any length of time, he would have to withdraw or risk destruction. Hence his only alternative was to launch an offensive before the difference in the respective strengths became too great. The British, therefore, deliberately adopted a strategic defensive.

On 30 August, Rommel launched the anticipated attack. It came at the southern sector of the line where the British, after much analysis, had decided it would come. By using armored units in mass and in defensive roles, avoiding antitank ambushes, and by heavy artillery and air bombardments of the enemy forces, the British forced the Axis troops to fight on ground of British choosing and they were repulsed with considerable losses. Thus, the last threat to Egypt was ended. The battle resulted in further increasing the British relative superiority in troops and matériel.

After this battle, the British continued the preparations for the coming offensive. Vitally needed Sherman tanks were arriving from America. New six-pounder antitank guns were received and placed in the hands of the seasoned desert troops. The X Armored Corps, consisting of the 1st

and 10th Armored Divisions, was assembled in rear areas and conducted extensive training exercises to make it ready to perform the role of the exploiting force. Throughout his army, General Montgomery emphasized three basic fundamentals: leadership, equipment, and training. The enthusiasm and anticipation of the Eighth Army increased hourly.

By mid-October it was obvious that the British offensive was imminent. The period of full moon was approaching. The British could now show a force of 177,000 men, 1,000 tanks, 900 artillery pieces, 1,500 antitank guns, and an air force capable of attacking with 700 bombers at one time, against an Axis strength of

93,000 men, 500 tanks, and 1,400 artillery and antitank pieces, and 700 planes dispersed in Africa, Sicily, Greece and Crete.

The Eighth Army was now ready to attack, and plans were completed not only for the attack, but also for a vigorous exploitation and pursuit to drive Rommel out of Africa.

General Montgomery tentatively chose the night of 23-24 October for the commencement of the attack. On 18 October, the Royal Air Force, which had been attacking the coastal road in the Axis rear and the port facilities as far back as Tobruk and Benghazi, suddenly intensified its efforts and directed them more on the enemy forward area. The air offensive concentrated on three objectives: (1) to force enemy aircraft to assume a defensive role; (2) to destroy supply and communication facilities; and (3) to break the morale of the Axis troops by keeping them awake and continuously harassed for three days. The attack was delayed until the RAF could give positive assurance that it held complete domination of the air. On 23 October this assurance was given and the attack was launched.

The battle line was as shown on Map 2. The British plan called for a penetration in the north sector by the XXX Corps with a secondary attack on the remainder of the position. The XXX Corps was to breach the enemy defenses, after which the X Armored Corps was to pass through the gap and commence the exploitation and pursuit.

What is Pursuit?

Webster's Collegiate Dictionary defines "pursue" as "to follow with a view to overtake; chase"; and "pursuit" as the "act of pursuing." Technical Manual 20-205, *Dictionary of the United States Army Terms*, defines "pursuit" as "following a retreating enemy force and keeping it engaged for the purpose of destroying its combat power." Neither of these definitions is complete nor entirely clear. The latter definition implies a straight pushing

back of an enemy force along its line of communications. This will not necessarily destroy an enemy's combat power. Field Manual 100-5, *Operations*, states that "the object of the pursuit is the annihilation of the hostile forces." It further states that "direct pressure against the retreating forces must be combined with an enveloping or encircling maneuver to place troops *across the enemy's line of retreat.*" Thus, a more descriptive definition appears to be "following *and cutting off* a retreating enemy force in order to destroy it."

Now that a definition for the pursuit has been established, the next problem which arises is the determination of the principles of the pursuit. What are the factors applicable to the conduct of the pursuit? These factors fall into four general categories as follows:

(1) The conditions necessary prior to launching a pursuit.

(2) The time to launch a pursuit.

(3) The technique of the pursuit.

(4) The conditions necessary in the conduct of the pursuit.

Conditions Necessary Prior to Launching a Pursuit

The conditions which should be present prior to launching a pursuit are the following:

(1) Superiority of force, matériel, and supply.

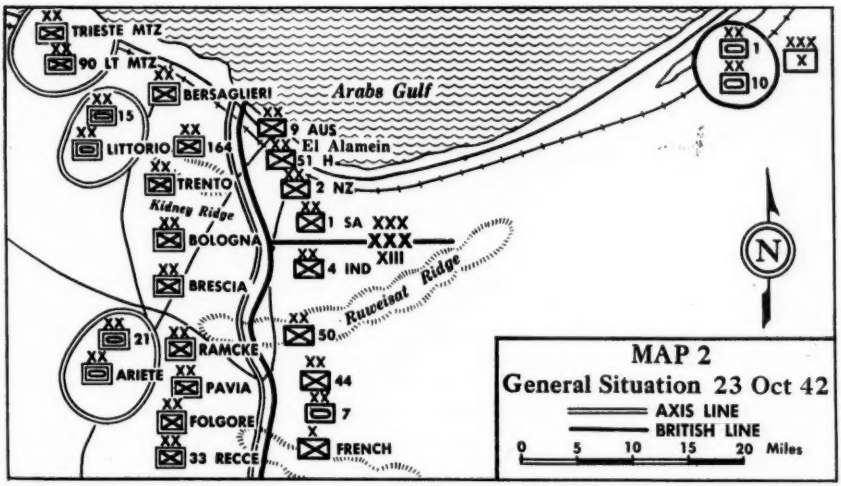
(2) Air superiority.

(3) A breakthrough or disintegration of the enemy defenses.

(4) Favorable weather.

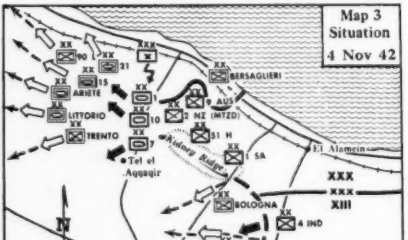
(5) Favorable terrain.

We have already noted how the British Eighth Army achieved superiority over the Axis forces, in men, matériel, and supply. We have also seen how General Montgomery launched the attack at El Alamein only after he had received assurance from the RAF that air superiority had been attained. Thus is demonstrated compliance with the first and second conditions which we have listed. Now let us examine the other three conditions as they were present in the British preparations for the pursuit of Rommel's forces.



The breakthrough was achieved on 2 November 1942, and soon thereafter the exploiting force started passing through the gap. This force consisted of the X Armored Corps followed by the 7th Armored Division and the 2d New Zealand Infantry Division (motorized) (see Map 3).

It has already been mentioned that the British attack was launched during the full moon period in order to take advantage of the light for night attacks. Equally important was the weather, as rain could have ruined the entire operation by reducing the mobility of the pursuing



forces, slowing the follow-up of supplies, and hindering the vital air operations. Actually, heavy rains set in on 6 November and continued for several days. The effect of this rain on both the retreating and pursuing forces along the coastal road was the same, but it completely immobilized the vehicles of the British encircling forces on the desert to the south. Similarly it seriously impaired the British air operations. Fuel and supplies failed to reach the forward units. It has been said that these rains saved the Axis forces from annihilation at that time, enabling them to escape to the west. This may indeed have been the case. The condition of favorable weather is thus emphatically illustrated.

In selecting the location for his breakthrough, General Montgomery was influenced more by the enemy dispositions than by terrain. As far as terrain was concerned, he could have chosen several places in the line between the sea on the north and the Qattara Depression on the south, as maneuver beyond the few ridges in the enemy defensive position was comparatively unhampered by terrain. Of course, it is obvious that terrain prevented an encircling maneuver to the south and dictated that the attack be a penetration. However, many times the selection of the area of a breakthrough will be considerably influenced by the terrain in the rear of the enemy defenses. This terrain should be such that the use of mobile forces, particularly armor, will be favored. The exploiting forces must not be canalized or delayed by terrain features either at the time of commitment or later in the pursuit.

The Time to Launch a Pursuit

Field Manual 100-5 states that "the pursuit is launched when the enemy is no longer able to maintain his position and endeavors to escape by retreat." Exactly when this phase of a battle is reached is often very difficult to determine, but there are certain indications which will enable the commander of the attacking forces to make his decision to launch the pursuit. Some of these indications are an increasing number of prisoners, the abandonment of matériel, abandoned dead, diminution of artillery fire, the cessation of counter-measures, and reports of enemy withdrawal. Some military men condense these various indications down to one—when the soldier in the front line is able to stand up and move forward, the time has come to launch the pursuit.

It has been previously mentioned that the gap in the enemy position at El Alamein was made on 2 November. How-

ever, it was not yet clear, at this time, that the enemy intended to abandon his positions, and that anything more than an exploitation of the breach was indicated. The necessary indications appeared on 3 November. A report by Lieutenant General Freyberg, the commander of the 2d New Zealand Division dramatically illustrates these indications. "On going around the front, I saw a great change. Everything seemed to point to a general enemy withdrawal. Divisional cavalry found the enemy were moving back from the north of the salient. . . . Many dug-in tanks had been destroyed and there was a considerable amount of equipment and many German dead in No Man's Land. In the early afternoon of 3 November, I saw the Army and Corps Commanders and said that there would be no more fighting. So certain was I that I drafted a cable to the New Zealand Government giving them early news of the battles we had fought." Also on 3 November, the Desert Air Force reported heavy traffic moving westward on the coast road. In view of the fact that the breakthrough had been made, and that the enemy was hastily withdrawing, General Montgomery made his decision to send his pursuing forces to drive westward to cut off the Axis retreat.

The Technique of the Pursuit

Upon effecting the breakthrough of the enemy El Alamein defenses, and upon receiving the reports of the hasty withdrawal of the Axis troops, General Montgomery ordered his pursuing force of the X Armored Corps, the 7th Armored Division, and the motorized 2d New Zealand Division to move rapidly to cut off the Axis retreat. He assigned the pursuing force the following missions:

(1) Cut off the retreating enemy.

(2) Get astride the Axis supply route and disarrange its supply services.

(3) Seize Axis air fields for subsequent use by the Royal Air Force.

(4) Effect the disintegration of the entire Axis forces.

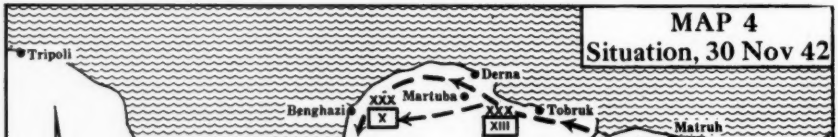
As initial objectives to accomplish these missions, part of the pursuing force was directed to cut the coast road at Fuka while the remainder was to advance across the desert to cut the road at Matruh. As previously mentioned, the heavy rains of 6-8 November prevented the accomplishment of cutting off the Axis forces at this time. After reaching Matruh, the pursuing force was directed to seize the Martuba air fields for use by the RAF and subsequently to cut off the enemy at Benghazi. In advancing on this latter objective, part of the spearhead troops used the coastal road and part cut across the desert directly on Benghazi. In these operations, the separate units were released from close centralized control and advanced as rapidly as they could at their own rates and on their own selected axes of advance. Thus we see the use of deep objectives, wide fronts, decentralized control, and a continuous impetus to accomplish the mission of cutting off and destroying the enemy.

When the pursuit was launched, the XIII Corps was directed to send mobile columns to race westwards along the entire corps front to round up the demoralized Italian divisions which had been left by the Germans with little water or transportation. The XXX Corps followed the advance of the pursuing force. As the X Corps advanced rapidly westward to cut off the main enemy force, many small Axis units were left isolated by themselves. These troops were rounded up by the two following corps.

The Royal Air Force operated at maximum intensity, attacking enemy supply installations, air fields, lines of communications, and continually harassing the long columns of the retreating Axis combat forces. The purpose of these attacks was to disrupt the Axis retreat and to maintain air superiority. Also, the

RAF provided air cover for the armored spearheads of the Eighth Army. Air fields were moved forward as rapidly as possible in order to provide maximum support. It was for this reason that the pursuing force was given the mission of seizing air fields. In addition, the Royal Navy operated along the coast on the flank of the retreating Axis forces, firing into their columns and on their supply installations.

Toward the end of November, the Axis forces had reached El Agheila (see Map 4). This area provided a very strong defensive position, bounded on the north by the sea and on the south by the Wadi Feregh, an extremely difficult obstacle to traverse. It had long been regarded as the position controlling the gateway to Cyrenaica. There, Rommel turned and commenced to organize a defensive position. General Montgomery realized that he could not afford a battle in which the Eighth Army would suffer serious casualties, as this would sap his strength for continuing the pursuit. However, he also realized that here was an opportunity to capture or destroy the main Axis force. Thus, he planned a bold maneuver to accomplish this. A direct pressure force would attack along the coast while the 2d New Zealand Division made a forced march across the desert around the supposedly impassable obstacle of the Wadi Feregh and came in on the Axis rear. Rommel, however, decided not to stand and fight, and withdrew the greater part of his force before the encircling British troops could get behind them. The 2d New Zealand Division made remarkable progress in its envelopment and did cut off the Axis rear guard. However, this rear guard split up into small units and was able to escape during the night. Although this maneuver failed to trap the Axis forces, it did turn the enemy out of his position. This operation effectively illustrates the maintaining of the momentum of the pursuit by the expeditious use of aggressive encircling maneuvers in conjunction with direct pressure.



From the foregoing description of the pursuit by the Eighth Army from El Alamein to El Agheila, we can extract several principles, the proper application of which form the technique of the pursuit. These are:

(1) Missions designed to destroy the enemy main force and prevent the reorganizing of his defenses.

(2) Decentralized control.

(3) Objectives deep in enemy's rear.

(4) Continued impetus of the pursuit night and day.

(5) Operations on a broad front.

(6) The by-passing of small centers of

resistance and concentration on the destruction of the main enemy forces.

(7) The use of every available means to press the pursuit.

Conditions Necessary in the Conduct of the Pursuit

A pursuit is conducted with whatever means are available. However, there are certain conditions which are necessary to the successful accomplishment of a pursuit. These include the following:

(1) The use of forces as mobile as, and preferably more mobile than, those of the enemy.

(2) Speed of advance.

(3) Aggressiveness.

(4) Adequate supply.

Whenever available, armored units should form the nucleus of the pursuing forces. They possess the required mobility and fire power for effectively cutting off a retreating enemy. However, these armored units should be closely supported by mobile infantry units for consolidating the gains made and protecting the armor from enemy antitank weapons. It has already been noted that General Montgomery, in planning his attack at El Alamein, foresaw the need for a mobile exploiting force. Thus he formed the X Armored Corps. When the pursuit started, the motorized 2d New Zealand Infantry Division was attached to the X Corps in order to provide the necessary close support. Throughout the entire pursuit from El Alamein to Tripoli, speed was the keynote. The only delays were caused by weather, lack of supplies, or periodic regrouping of units.

It must be realized that armored forces and motorized units will not always be available, nor will the situation always be such that vehicles can be employed. Jungle and mountainous terrain may well prevent the use of vehicles. In such cases, the pursuit is conducted with foot troops. However, the use of speed is still of prime importance and the foot units must maintain relentless rates of advance. The successful culmination of a pursuit may be a large step toward eventual victory. Therefore, all troops must be pushed forward to the limit of their endurance.

During the first week in January 1943, the leading elements of the British Eighth Army had advanced to within 200 miles of Tripoli, its next objective, when a storm wrecked the port of Benghazi, the Army's principal supply port. The only available port now was Tobruk, 250 miles farther to the east. There were not sufficient supply vehicles to supply the Eighth Army from Tobruk. Hence, at first glance it would appear that the only solution was for the Eighth Army to turn back in order to insure its supply. However, that would have ended the pursuit and given Rommel a chance to rehabilitate his forces, receive reinforcements, and reestablish the German position in Africa. General Montgomery estimated that it would take him ten days to reach Tripoli, the possession of which would assure his supply. He also estimated that, because of the demoralized state of the enemy, he could press the pursuit with only part of his army. He, therefore, "grounded" the other part, turned the vehicles over for supply purposes, and commenced to build up ten days' supplies. On 15 January, the attack was launched with a coastal thrust directly under the command of General Montgomery and a cross-desert outflanking operation by the 7th Armored Division and the 2d New Zealand Division under the XXX Corps Commander. Early on 23 January, eight days later, the leading elements of the Eighth Army entered Tripoli. General Montgomery's estimate of ten days was not far off.

This operation demonstrates the great importance of supply. With circumstances slightly different, the loss of the port of Benghazi might well have meant the end of the pursuit and might have led to a resumption of the "back-and-forth" cam-

paigns of the preceding two years. The factor which overcame this lack of supply in this situation was General Montgomery's aggressiveness. In a sense, it was a gamble, but it was a considered gamble, and no pursuit can be successful without taking a few chances in order that the pursuing force is always the aggressor. Of further interest is the fact that this operation illustrates several factors already discussed. These are the use of an encircling maneuver in conjunction with a direct pressure force, an advance on a broad front, decentralized control, and speed.

Conclusion

Now that we have reviewed the four general categories of factors applicable to the pursuit as classically demonstrated in the Eighth Army's advance to Tripoli, let us condense them into what can be termed the principles of the pursuit. In determining these principles, it is well to look again at our definition of pursuit. The principles should be those which most effectively contribute to the *following*, *cutting off*, and *destroying* the enemy. With this in mind, the following emerge as the principles of the pursuit:

(1) Aggressiveness.

(2) Speed by use of mobile forces, broad fronts, and decentralized control.

(3) Continual concentration on the destruction of the main enemy force.

(4) Relentless maintenance of forward momentum night and day, using all available means.

Modern infantry is a master of more weapons than ever before, and the infantryman's life depends primarily on the skill with which he uses them; he must reach an increasingly higher standard of training. It (World War II) has been a war of movement, but although the infantryman may motor into battle, his training must keep him hard and tough—a point which must never be overlooked in these days of troop carrying transport.

Field Marshal Viscount Bernard L. Montgomery

We do not have—and we cannot hope to have and we do not want to have—the largest Army in the world, either today or in case of war. But the advantage in numbers of the armed forces of any other country must be offset by providing our nation not only with the best equipped but also with the best trained soldiers and sailors and airmen in the world.

Secretary of the Army Kenneth C. Royall

The Supply of Civilians in Liberated and Occupied Areas

Lieutenant Colonel Robert W. May, *Quartermaster Corps*
Instructor, Command and General Staff College

WHILE the responsibility of military commanders for the security and welfare of the population uncovered by advancing battle lines in liberated and occupied territories has been recognized by international law and agreements, the underlying reasons for the important though frequently unappreciated part played by civilian supply in campaigns are rooted not only in legal concepts, but are indissolubly compounded from military, economic, and political considerations.

Thus, the all-encompassing nature of modern warfare, which has blended political with military decisions to an extent not known before, has, by the same token, lent strategic and dynamic urgency to the static convention of international law. As armies strike inward from a periphery, they must of necessity advance through areas successively isolated from their normal sources of supply and markets. They are compelled, as a vital measure of security of lines of communications, to restore and maintain public order; and, as one measure of troop protection, to prevent the spread of disease. It was because of these considerations that General Eisenhower cabled the War Department during the campaign in Italy: "Unless reasonable quantities of food are supplied very promptly we will experience sabotage, unrest, and a complete cessation in all those activities necessary to our advance."

Army Responsibility

During the period of active operations, it is apparent that the initial burden of civilian supply must be planned for and handled by the army. The commander of each area occupied is responsible that the population has sufficient supplies to maintain the minimum standard of living and insure the maximum support of the military operations within his area. He must have a great appreciation of the magnitude of the demands and of their impact on available supply and transportation.

Upon the invasion of a country, the minimum economic relief for the population must be furnished. Requirements for such relief should be limited to those which are essential for the period of military occupation, but as the length of this period may be rather indefinite, it is desirable that the military procurement be coordinated with that of the civil authorities for purposes of long term production planning. As such, requirements should be confined to making available the minimum quantities of food, fuel, clothing, medical, sanitary, and other essential supplies agreed upon as necessary to maintain the health and working capacity of the civilian population, as well as those required to preserve public order, protect lines of communications, and, where appropriate, develop local resources to lighten the supply burden of the army.

Supply Categories

Civilian supply requirements can be placed into three general categories according to military, political, or strictly economic policy. In the first category are those supplies deemed essential to meet urgent civilian needs to the extent necessary to prevent disease and unrest prejudicial to military operations. In the second category are those supplies considered essential to meet civilian needs necessary to achieve the political and economic objectives of the occupation as established by higher authority, to prevent internal repercussions, and to assist in the production of goods contributing directly to the war efforts. In the third category are those supplies, over and above those in the first two categories, that are considered necessary and important to the industrial and civilian life of the country, although the lack of such supplies would not cause severe internal repercussions or hinder the war program. In almost every situation it will be necessary for the army to provide supplies in the first and second categories, but rarely should requirements for those in the third category be considered favorably.

Requirements must be carefully reviewed by proper authority. Since the great bulk of the requirements are for food, fuel, medical and agricultural supplies, and industrial raw materials and supplies, some of the factors that enter into the review are population statistics, production of indigenous supplies, legal rationing practices, essential supplements to minimum food allowances, and industrial activity.

One of the first major considerations facing an invasion force is the civilian food requirements. It can be expected that the enemy has gathered up available native foodstuffs and will carry away or destroy as much of it as possible when he retreats. In determining the adequacy of food requirements, it is not possible merely to take the entire civilian population of a country or zone of occupation as a basis. Detailed studies must be made of the latest population statistics, broken down by sex, age group, and economic activity. Specific ration allowances must be provided for children and adolescents and a minimum ration for the so-called "normal consumer," who may be defined as a sedentary adult who performs light work, such as a housewife or clerk.

The normal consumer is provided the basic ration which is usually about 1,500 calories, or a little more than one-third the ration normally provided the American soldier. This is supplemented for those who qualify because of economic activity, health, or other special reason. For example, pregnant women will require 2,500 to 3,000 calories, and laborers performing very heavy work in coal mines will require about 4,000 calories. On the other hand, those individuals who are not engaged in any justified activity should be required to get along only on such food as is available locally. Also, consideration must be given to the "eating habits" of the population. For example, Orientals require more rice and fish in their diet and Europeans use more grain products than the average American.

Other supplies which require primary consideration are medical and sanitary supplies, fuel and clothing. Although the location, climate and state of civilization of the area occupied will determine to a large extent the requirements for these supplies, suffice it to say that every precaution must be taken to protect the health of the population and keep down disease that might affect our own troops.

Agricultural, industrial, and transportation supplies and equipment normally should be considered only in the long range economical and political requirements.

Equitable Distribution

In order to insure an equitable dis-

tribution of civilian supplies on the basis of actual needs, it is incumbent upon each commander to keep informed of the requirements and resources of his area.

Procurement of supplies from the zone of interior for civilian use should be held to an absolute minimum and limited to the allocation of specific items for the particular country or area of operations after considering the availability from local resources.

To minimize imports from the zone of interior, maximum use must be made of captured enemy supplies, salvage, and indigenous supplies available locally, especially foodstuffs and fuels. The most exact studies of current agricultural and industrial production are necessary. This factor is difficult to determine and control, since the more an individual produces, but refuses to disclose to official agencies of either the military government or the government of the occupied area, the better will be his own situation both as to the consumption of his family and friends and the amount that he can throw onto to "black market." We probably never will have sufficient troops available in a theater of operations to control adequately the gathering of absolutely reliable information on production, with the result that import requirements will always be inflated by stocks on hand that never legally existed. Comparisons with pre-war years of production statistics will help a great deal in checking the situation, but in making such comparisons, proper allowance must be made for the advantages available to production during those years.

Normal Supply Channels

To insure coordinated effort, requirements, procurement, storage, and bulk distribution of civilian supplies must be handled through the normal supply channels of the army. However in physically handling the supplies within the military establishment, it is best to keep the entire operation separated from the handling of other military supplies wherever practicable, including separate shipping as well as storage. Normally, such supplies should be used to meet civilian requirements. However, in case of emergency, they may be issued on a replacement basis to meet other army needs, or conversely, other army supplies may be used for civilian needs.

Distribution should be effected, wherever possible, by making suballocations of the supplies to zones within the occupied area on the basis of population and industrial needs, and deliver them in bulk to local authorities or civic organizations to distribute, under military supervision, to the populace. Delivery should be made at ports, depots, or supply points, as the situation dictates, and the civilian agencies required to provide the transportation from these points.

To illustrate the enormity of civilian supply requirements in modern warfare, approximately thirteen million tons of such supplies is quoted as the amount furnished by the Allies from September 1943 through September 1945. Of this amount, some seven million tons were provided from the United States alone at a cost of approximately one billion dollars. The significance of these figures is perhaps better appreciated when it is realized that approximately ten million tons of the supplies, about 70 per cent of the total delivered, were shipped prior to the termination of active operations during a period of the utmost strain on Allied shipping and supply resources and when no expenditure of effort could be permitted for purposes other than those necessary for the assurance of victory.

Broad Policies Required

From the above it can be realized that the provision of supplies for the relief of the civilian population will be a major undertaking in any future war, regardless of whether or not that war is waged

within our own country or overseas. Broad policies must be established and plans developed in advance at highest government level as to the part the army will play—aside from purely military responsibilities—in supporting the civilian population. There must be full integration of civilian supply with military supply procedures in all phases. There must be a general economic approach on the part of the army to problems of civilian supply as opposed to a purely relief approach. A supply program limited to the items of immediate relief, and implemented in a way not related to other areas of the economy, generates nothing in the long run but greater demand for more relief supplies and more means for transporting them. Finally, there must be effective integration of the many governmental agencies that must, of necessity, participate in implementing the civilian supply policies of the government during the period of military responsibility, and since that responsibility is both limited and temporary, set up the machinery that will insure orderly succession in the passing of that responsibility to other agencies.

It is my personal opinion that the greatest single motivating power for World Peace is the organized military potential of the United States—its resources, its technological advancement, its trained manpower.

General of the Army Dwight D. Eisenhower

The application of science to logistics is a never-ending process. Because we lagged behind in applying science to military logistics prior to World War II it was only our intense speed of application, coupled with our tremendous industrial capacity and our good fortune in having no enemy interference with our production, that enabled us to win over our enemies. We cannot afford to take this chance again.

Major General Anthony C. McAuliffe

TAC vs. STRAT

Colonel R. J. Browne, *USAF*
Former Director, Air Section, Command and General Staff College

WHAT is all this talk about "Strategic Air Forces" and "Tactical Air Forces?" During these post-war days there has been a great deal written about "Strategic Air Power"; our service schools are teaching—"Tactical Air Forces will cooperate with the Ground Forces in accomplishing . . ." Even at the Command and General Staff College the basic principles of the employment of "Tactical Air Power" are being taught, while the role of the "Strategic Air Forces" is given a more general treatment, since it is considered a particular responsibility of the Air Force. The question then arises—Are we correct in compartmenting air forces into "tactical" and "strategic" and is our concept of "tactical" and "strategic" employment correct?

If we look into the past, we find that we had in the United States the First, Second, Third and Fourth Air Forces—the training air forces. Overseas there was the Fifth Air Force in the Southwest Pacific; the Sixth Air Force in the Caribbean; the Seventh Air Force in Hawaii and the Pacific Ocean Area; the Eighth Air Force in England, later deployed to Okinawa; the Ninth Air Force that started in Egypt and ended in Germany; the Tenth Air Force in India and Burma; the Eleventh Air Force in Alaska and the Aleutians; the Twelfth Air Force in the Mediterranean; the Thirteenth Air Force in the South Pacific, Guadalcanal and to the north; the Fourteenth Air Force in China; the Fifteenth Air Force in Italy; and the Twentieth Air Force with Headquarters in Washington, D.C., and its aircraft in the Marianas. Among these air forces, nowhere do we see the words "Strategic" or "Tactical" appended to their names. Yet it was fairly well known that the Eighth, Fifteenth and Twentieth Air Forces were known as "strategic" air forces while the Ninth, and Twelfth Air Forces were operated as "tactical" air forces. There was but one air force that was actually classified according to its employment, that was the First Tactical Air Force (Provisional) that operated with Sixth Army Group in Southern France, and as its name implies, it was a provisional organization and not recognized by the War Department.

None Alike

If one examined closely any one of the sixteen air forces listed above, he would find no two alike in equipment, organization or employment. Air forces, like field armies, are not standard organizations; they are task forces, organized and administered by a headquarters to do a job, with equipment tailored to fit the needs of the job requirement.

We find the basic principles of organization of air forces in Section III, ORGANIZATION, Field Manual 100-20. These principles, while basic, are broad and written in language that is not sufficiently specific to be used in instruction in

service schools without further amplification. Such statements as "In a Theater of Operations, there will normally be one air force . . . However, the normal composition of an air force includes a strategic air force, a tactical air force, . . ." need clarification. This article will, therefore, attempt to analyze the nature of air forces and the need, if any, to classify them, as "strategic" or "tactical."

Before any attempt is made to analyze the nature of air forces, let us try to arrive at a definition of the words, "strategic" and "tactical" as applied to an air force. Right here is where the lexicographer would be on his own and could not fall back on his old friend Mr. Webster. TM 20-205, *Dictionary of United States Army Terms*, offers little assistance, though it is dated 18 January 1944. Even the ageless military writings of Clausewitz sheds little light on the subject. Clausewitz said, "Tactics is the theory of the use of military force in combat; strategy is the theory of the use of combat for the object of war." The simple conception of the average layman that strategy deals with military operations before contact has been established between the opposing *surface* forces, while tactics is concerned with operations after *surface* contact has been established comes closest to leading us to the distinction between the words, "strategic" and "tactical."

If we analyze the operations of the U.S. Eighth and Ninth Air Forces in the European Theater of Operations before and after D-day 1944, we may arrive at a workable definition as it applies to air operations. Long before D-day, the Eighth Air Force was pursuing the assignment given to it at the Casablanca Conference in the spring of 1943, " . . . the destruction and dislocation of German military, industrial and economic systems and the undermining of the morale of the German people to the point where their capacity for armed resistance is fatally weakened." This was long before the doughboys of the Ground Forces had closed with the *Wehrmacht* on the shores of Normandy. By mission, the Eighth Air Force was conducting strategic operations. However, it was not as simple as that.

Eighth Air Force

Like an army maneuvering for position or a navy maneuvering for command of the sea, the Eighth Air Force, along with the RAF, was fighting to gain command of the air over Europe. The theory of air power is simple—destroy by means of air action the means and will of the enemy to fight. The application of this theory is vastly more intricate. Before it was possible to bring air power to bear on the German military machine it was first necessary to destroy the German Air Force. It was this phase of air operations which occupied the number one priority on the schedule for all Allied air forces until early spring of 1944.

The Ninth Air Force, which had been redeployed from Africa and the Middle East to England in the fall of 1943 and was being augmented by units from the United States, was engaged with and under the operational control of the Eighth Air Force in this aerial war against the *Luftwaffe*. Until April 1944 both the Eighth and Ninth Air Forces were engaged in strategic air operations.

With the approach of D-day, tactical targets were given highest priority. Aerial superiority had to be guaranteed, the battle area had to be isolated from any manner of reinforcement. Therefore, the Eighth and Ninth Air Forces, along with the RAF, turned from the aerial war to the surface war.

On and after D-day, the Ninth Air Force was released to purely tactical air operations. The IX, XIX, and XXIX Tactical Air Commands working with the

First, Third and Ninth U.S. Armies struck at German armed forces, the *Luftwaffe* and *Wehrmacht*. The Eighth Air Force, once the beachhead was secured, returned the major portion of its attention to its primary mission, the destruction of Germany's industrial capacity.

After D-day, we find the Ninth Air Force actively participating in the battle with the Ground Forces; the Eighth Air Force was on independent air operations. Between the Ninth Air Force and the 12th Army Group there was daily, intimate, detailed planning. The three tactical air commands of the Ninth Air Force had their headquarters adjacent to the three army headquarters and they engaged in joint planning and operations. The Eighth Air Force, on the other hand, being under the U.S. Strategic Air Forces in Europe, which was directly under the Combined Chiefs of Staff, received only broad requests from Supreme Headquarters Allied Expeditionary Forces. While the Eighth Air Force followed these broad directives, there was no daily planning or intimate communications between the armies in the field and the Headquarters Eighth Air Force, or between the front-line units and the heavy bombers overhead.

Distinction

With that in mind, it is believed we can arrive at a distinction between the tactical and strategic air force. If there is detailed joint planning, joint operations and intimate communications between the army and the air force, the air force may be termed a "tactical air force." If, on the other hand, there is no daily joint planning, little joint operations and limited communications between the army and the air force, then the air force may be termed a "strategic air force." In short, the distinction between "strategic" and "tactical," as far as air forces are concerned, rests with joint planning, joint operations and close communications.

This distinction, joint planning, joint operations and communications, does not take into account equipment. However, since we are dealing with principles in this article, equipment does not enter into the discussion. Naturally equipment has a great deal of effect upon concept, or perhaps it would be better to say, concept directs the procurement of equipment. But this latter statement has been found not always to be true. Douhet, Mitchell and Seversky have already advanced the concept that the ultimate objective of air warfare is to defeat an enemy solely by air action applied against its military and industrial capacity. This concept would require aircraft capable of fighting their way to any part of the earth's surface, delivering their bomb load and returning to the original base. Such aircraft have not yet been built. The B-36 is our nearest approach to a purely strategic weapon. The globe circling airplanes may be on the drawing boards but they are, as yet, a long way from flying and testing, to say nothing of production. Therefore, until equipment can arrive at the same advanced point as concept, we shall have to maintain the distinction between "strategic" and "tactical" aviation enunciated above.

Now that we have arrived at the distinction between "tactical" and "strategic" air forces, let us examine the operations of some of the air forces that operated in the active theaters of operations during the past war.

In the Southwest Pacific area, the Fifth Air Force, in the beginning, was a catch-all for what could be salvaged from the Philippines. Later, as its strength increased with reinforcements from the United States, it took on the appearance of a balanced air force. It had its Bomber Command, Fighter Command, Service Command and various other agencies necessary for both independent and joint operations.

If we should apply our definition for "strategic" or "tactical" to the Fifth, we would find that it was neither fish nor fowl, but a little bit of both. Many of its air operations were independent; therefore, by our rule, the Fifth could be classified as strategic. Many of its operations were joint and the result of intimate joint planning; therefore, it could also be called a tactical air force.

When one pauses to reflect upon the air operations in the Southwest Pacific, he is struck by the paradox that the Fifth Air Force did not support the Sixth Army, but on the contrary, the Sixth Army supported the Fifth Air Force. For the Sixth Army, advancing under the protecting arm of air cover, advanced from base to base to get closer to the Japanese homeland, in order that air operations could be conducted against the heart of the Japanese military machine. Thus we find that the Fifth Air Force was neither strictly a tactical nor a strategic air force, but a balanced air task force, designed and employed to accomplish varied tasks. If any fault can be found with the employment of the Fifth, it would be that there just were not enough aircraft to fulfill all the requirements for air operations.

In the Mediterranean another anomalous situation was presented. The Twelfth U.S. Air Force went into the "Torch Operations" with the XII Bomber Command, XII Fighter Command, and XII Air Support Command as part of its combatant components. Scarcely had the land battle started when the Bomber Command was integrated into the North African Strategic Air Force and the Air Support Command disappeared into the North African Tactical Air Force, a provisional combined Anglo-American pooling of aviation resources.

The North African Tactical Air Force, while a provisional organization and never recognized by the War Department, was the proving ground for Field Manual 100-20. Again a paradox presents itself. While one branch of the War Department wrote in FM 100-20, "In a theater of operations where ground forces are operating, normally there will be a tactical air force," another branch of this same government agency failed to recognize the existence, other than provisional organization, of the North African Tactical Air Force which was the "trial horse" of the new concept of tactical air operations.

North African TAC

The North African Tactical Air Force, by all standards, was a tactical air force. The planning and operations were intimate and joint. The headquarters of each component—British and American—were adjacent to its associate army. The North African Tactical Air Force not only performed the three missions of the tactical air force in the priority named: (1) air superiority, (2) isolation of the battlefield, (3) close support;—they "wrote the book."

On the other hand, XII Bomber Command or the North African Strategic Air Force, fulfills our requirements for a strategic air force. Yet its operations were not purely strategic in that it, like the Fifth Air Force, lacked the range to bring all power to the vitals of the enemy nation. Its operations were, in the main, independent of the Ground Forces; its principal operations were taken up with destroying the *Luftwaffe* within its range and paralyzing all Axis transportation in the Mediterranean.

The Twelfth Air Force, like the Fifth, was an air force designed for a specific purpose; it was part tactical, part strategic, and there can be no denying that it accomplished its purpose.

It can almost be categorically stated that no U.S. Air Force in World War II operated in a purely strategic role. The Twentieth Air Force operating out of the Marianas against the vitals of the Japa-

nese industrial system, destroying the will and the means of the Japanese nation to carry on war was directed from time to time by the Joint Chiefs of Staff to purely tactical operations. That statement is not offered as either a criticism of the Twentieth Air Force or to the directives given to it; it is meant to emphasize that there are exceptions to every rule in warfare.

The airman has an expression that he likes to use, by way of explanation to the soldier in all joint operations, "When you don't see the airplane, it is helping you the most." However, selling that concept is like selling insurance or preventive maintenance, it is difficult to explain to the doughboy in the foxhole. The foot soldier in the mud is in a precarious position, he is getting shot at and suffering punishment, and he does not care much about tomorrow. He is interested in what is happening right now.

To return to the European war for additional examples of air operations, the Eighth Air Force, even though under the Combined Chiefs of Staff for strategic operations, devoted nearly 80 per cent of its operations to tactical targets. The RAF Bomber Command, according to Air Chief Marshal Sir Arthur Harris, devoted 85 per cent of its operations to tactical targets. Those statements, while coming right from top commanders, are open to interpretations. When is a target "tactical" and when is it "strategic?" Was the bombing of the Leuna synthetic oil plant a tactical or strategic operation? Certainly the destruction of German oil reserves in the spring of 1945 had a direct bearing on the operations of the German Army. The hand-to-mouth existence of the German military economy was such that petroleum products were being shipped straight from the factory to the battle front. On the other hand, the operation was independently conceived under the broad directives of the Combined Chiefs of Staff. This argument of tactical versus strategic operations could, and probably will, go on until the next war. But it will be a battle of words and definitions with little added to the art of war.

There are three important postulates that can be drawn from the study of tactical and strategic air operations:

a. Air operations will precede surface operations in order to gain freedom of maneuver for the surface forces as well as the air forces.

b. Within the limits of equipment, all air forces can be used in either a tactical or strategic role.

c. Air forces should not be named as a "tactical" or "strategic" air force, but should be left to employ their power as the situation dictates without canalizing their operations into particular fields.

Faith that the strategic use of air power could be decisive in technical war must be converted into faith that air mobility, if properly understood, can preserve peace in the world. To make Air Power into Peace Power requires political vision of a high order.

General Carl Spaatz

The Army and UMT

Colonel C. G. Follansbee, *Field Artillery*
Instructor, Command and General Staff College

Legislation

General

AS this article is written, a bill rests in Congress which is designed to accomplish a major change in the military policy of the United States. This bill, if enacted, will provide, for the first time in our history as an independent nation, a system for the regular peacetime training of our male population to prepare them for possible service in the armed forces in time of war or grave national emergency.

We had such a system during the days preceding the American Revolution, as evidenced by over 600 laws of the thirteen original colonies. In each colony, membership in an armed militia, with periodic peacetime training and wartime service, was universal and compulsory. The passing years brought greater security, and a transition of power from town meetings to remote marble halls. In the process, the universal and compulsive features of *wartime service* were weakened and half-forgotten until 1917. Unfortunately the principle of universal and compulsory *peacetime training* was likewise obscured to all but a few men of vision, and remained obscured, until it was dug up, dusted off, and remodeled in this postwar era of long range aircraft and powerful destructive weapons.

The bill now before Congress to be known as the National Security Training Act when enacted, follows closely the recommendations of the President's Advisory Commission on Universal Training, made public late in May 1947, and presented in digest form in the December 1947 issue of the MILITARY REVIEW. It establishes the framework of Universal Military Training. If the presence of George Washington hovers over the Capitol a few short miles from where his remains lie in honored glory, his must be an anxious and hopeful spirit, awaiting the long delayed realization of a 160 year old plan for the safety and welfare of his country.

The Plan

Very briefly described, the impending legislation provides that all male residents, upon reaching eighteen years of age, are liable to commence a period of training with one of the Armed Forces, this training to be undertaken before reaching age twenty. The period of training will include two phases; the first of six months' duration, to be full-time continuous training in a National Security Training Corps; and the second to consist of one of a number of alternate programs of part-time training of varying lengths, as a member of one of the civilian components of the Armed Forces, or voluntary additional periods of full-time training in the Corps or in one of the Regular Armed Forces.

National Security Training Commission

Under the proposed bill, top control of the Universal Training program will rest with the National Security Training Commission, consisting of two civilian members and one military member ap-

pointed by the President, as a permanent agency of the Federal Government. This commission will have a working staff headed by an Executive Director appointed by the Commission. One of the civilian members will be selected by the President as Chairman, with a salary of $15,000 a year. The other members and the Executive Director would have salaries of $12,500 and $12,000 respectively.

The Commission will establish policies and standards for, and will supervise, inspect, and control the execution of the Universal Training program. Coordinating the operations of the Armed Forces, the Selective Training System, and other civilian agencies involved, it will be the Chief Executive's principal agency for the operation of a training system vital to our future security and welfare, and sensitive to public opinion. The provision for civilian policy control seems most wise.

Advisory Board

The Commission will be assisted by a General Advisory Board of ten to twenty-five members, appointed by the President from among leading civilians in all fields of endeavor. At least three of the members must be appointed from the Armed Forces. The Board will devote only part-time to its duties, but will presumably study various aspects of the program and make recommendations to the Commission.

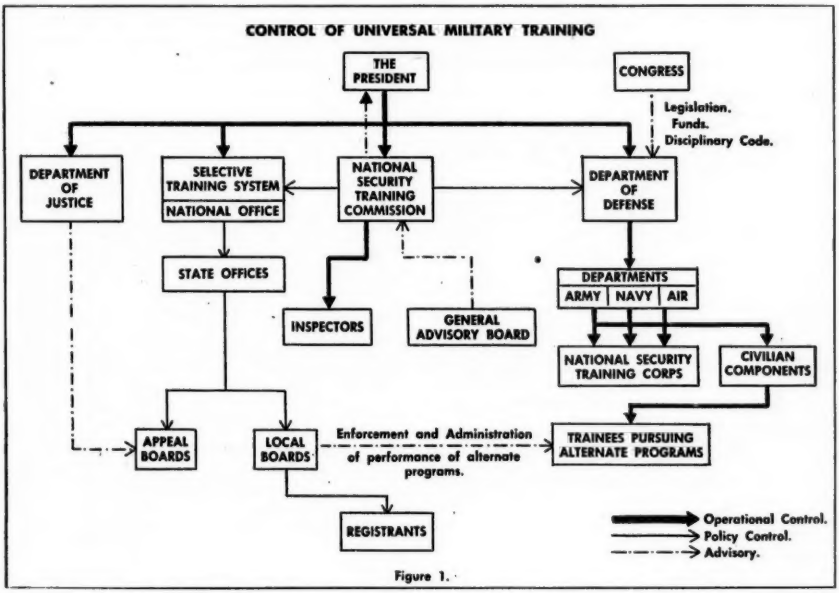


Figure 1.

Selective Training System

The bill establishes a Selective Training System within the Office of the Director of the Office of Selective Service Records, to accomplish the tasks of registration, examination, classification, assignment to training, delivery to training, and maintenance of records. The Selective Training System will have a national headquarters, an office in each state, and local civilian boards in every county. An

appeal board will be established in every state. In most respects, the organization will be similar to the Selective Service System of World War II. It is obvious that the active operation of the Selective *Training* System during peace will greatly facilitate the reinstitution of Selective *Service* operations in wartime. It is just another illustration of the axiom that when a concept is basically sound, the administrative arrangements fit together easily into a pattern that reflects the basic intent of the concept.

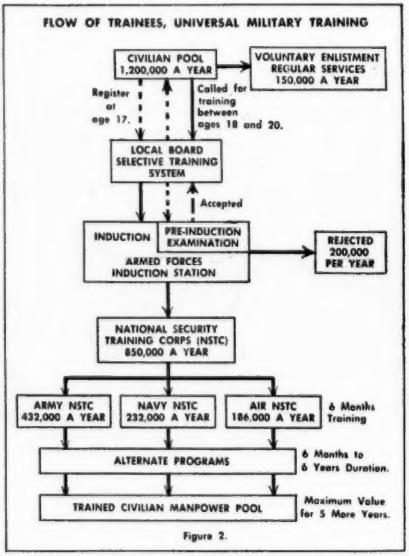
Manpower Inventory

Another far-sighted provision in the bill requires that, for a period of six years following the completion of his first six months training, each trainee keeps his local board advised of his address, his occupational and service status, and other information primarily intended for control purposes, but having considerable military value in mobilization. The local boards are responsible for the administration and enforcement of the alternate programs of training to which each trainee is assigned and must keep registers of all trainees, persons exempted from training, and conscientious objectors, for a period of six years after initial training or exemption therefrom.

Army Plans

Induction

The Armed Forces will first come into contact with the young registrants at the induction stations to be operated by armed forces personnel, under the control of army area commanders. Sometime during the three month period preceding the date when he must commence training, the registrant reports to the induction station for a pre-induction examination to determine whether he meets the standards for training established by the Armed Forces. Upon his second trip to one of the sixty induction stations to be operated, the young man is inducted into the National Security Training Corps, and is allocated to the Army, Air Force, or Navy for training. This allocation will be based upon the young man's choice to the extent practicable, but will obviously be subject to quota control in order to give each force its proper proportions of physical and mental qualifications and numbers inducted. In view of the alternate programs open to the trainee at the end of six months another consideration must be the proximity of his home to reserve components


FLOW OF TRAINEES, UNIVERSAL MILITARY TRAINING
CIVILIAN POOL 1,200,000 A YEAR
VOLUNTARY ENLISTMENT REGULAR SERVICES 150,000 A YEAR
Register at age 17.
Called for training between ages 18 and 20.
LOCAL BOARD SELECTIVE TRAINING SYSTEM
Accepted
INDUCTION
PRE-INDUCTION EXAMINATION
ARMED FORCES INDUCTION STATION
REJECTED 200,000 PER YEAR
NATIONAL SECURITY TRAINING CORPS (NSTC) 850,000 A YEAR
ARMY NSTC 432,000 A YEAR
NAVY NSTC 232,000 A YEAR
AIR NSTC 186,000 A YEAR
6 Months Training
ALTERNATE PROGRAMS
6 Months to 6 Years Duration.
TRAINED CIVILIAN MANPOWER POOL
Maximum Value for 5 More Years.
Figure 2.

of the several Armed Forces. The trainee's basic records are initiated at the induction station. Reception processing takes place at the training stations of the Army, Navy, or Air Force to which he is assigned.

Six Months' Training Period—Army

Now that we have the young trainee in his army UMT camp as a member of the National Security Training Corps, let us examine the initial six months phase

of the plan, as it is to be implemented by the Army.

Objectives

It is well to state the objectives of the Universal Military Training Program before proceeding. The primary mission of the program is to provide a large reservoir of men trained as individual soldiers, as specialists, and as members of teams, to permit the rapid mobilization of the Army of the United States in an emergency. This involves providing men, trained as individuals and as teams, for the general (civilian) mobilization reserve, for the National Guard, and for the Organized Reserve Corps. A coordinate objective is to develop leadership, and to earmark men suited for further training as officers and noncommissioned officers. Collateral missions are to improve the physical well being of all trainees; to develop in the trainee that sense of responsibility, integrity, honor, and dependability, essential to a well disciplined army; and finally to provide for the moral and religious welfare of the young trainee, in recognition of the fact that the strength of the nation depends in a large measure upon the spiritual fiber of our people.

UMT basic infantry training.—Signal Corps photo.

Do not be deceived by the non-military objectives—the planned training is as thorough and "tough" as any wartime training course—but promises to be much more intelligently handled! Fortunately good military training of the sort envisaged in the plan, and practiced at Fort Knox, can produce the important non-military by-products, of good citizenship—health, good morals, integrity, and spiritual motivation.

Disciplinary System

The system of discipline under which the trainees will live during their six months in camp is prescribed by a Code of Conduct contained in the proposed National Security Training Act. Generally this system provides for United States District Court Jurisdiction over crimes and serious offenses, state and local court jurisdiction over minor offenses against civil law, and jurisdiction by military commanders and National Security Training Corps courts, composed of officers, over military offenses. The punishments which can be adjudged by military courts is limited generally to a maximum of three

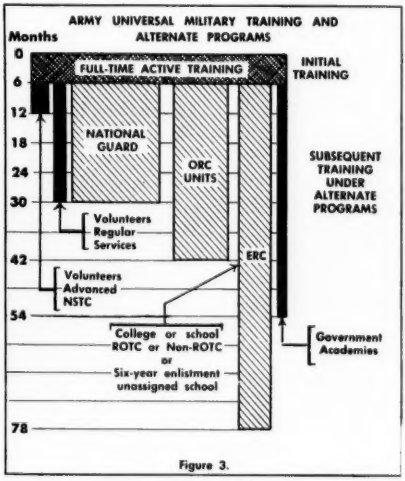


Figure 3.

months confinement, and bad conduct or dishonorable discharges. The powers of commanding officers are similar to those included in Article of War 104.

Responsibility for Training

The Commanding General, Army Ground Forces is responsible for the execution of Army Universal Military Training. Actual operation of training divisions and training camps will be delegated by Army Ground Forces to the Commanding Generals of the Army Areas within which the camps are located.

Camps

The number of army camps to be used for Universal Military Training is not yet firm, but generally they will be the posts with the greatest housing capacity and best training facilities. Each Army Area will have at least one such camp, and generally it will be the aim to have trainees drawn from one Army Area undergo training in the same area. This will not always be possible, for some Army Area capacities will be lower than their potential trainee populations and trainees will have to go to camps in adjoining Army Areas. While it is desired to place the maximum number of trainees in each camp used for economy in personnel and facilities, it is unlikely that any single camp will include an entire National Security Training Corps Division, because of housing limitations.

Allocations to Branches

The problem of allocation of trainees to the arms and services for training will arise upon the arrival of the first trainees at each training camp. In determining the quota allocations the following factors will be considered:

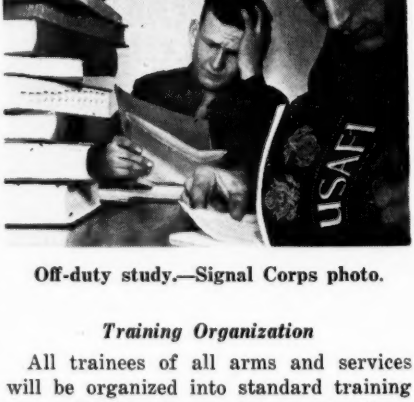
The proportion of troops in the various branches of the Army in the European Theater, on VE-day.

The number of personnel in each arm or service in the entire Army, in 1945.

The requirements of the National Guard and Organized Reserve Corps troop bases.

The casualties, by arm or service, incurred during World War II. Consideration of these factors has resulted in tentative plans to allocate trainees as follows:

	Per cent
Infantry	33.0
Artillery	16.5
Armor	12.38
Engineer	12.38
Signal	4.13
Transportation	4.13
Ordnance	4.13
Quartermaster	4.13
Medical	4.13
Chemical	0.90
Other	4.13



Off-duty study.—Signal Corps photo.

Training Organization

All trainees of all arms and services will be organized into standard training units. Within these training units there may be formed temporary combat and service type units, to facilitate branch and small unit training.

The organization of the Training Division is indicated in Figures 4 and 5 herewith. Companies and battalions composed of negro personnel will be trained together with similar units of white personnel in the larger training units.

Overhead and Cadre

Obviously it is going to take a lot of

people to run this program. Current estimates of the required military and civilian personnel follows:

Officers	18,963
Warrant Officers	715
Enlisted	66,833
Total Military	86,511
Civilian	30,352
Aggregate	116,863

The proposed law authorizes this over-

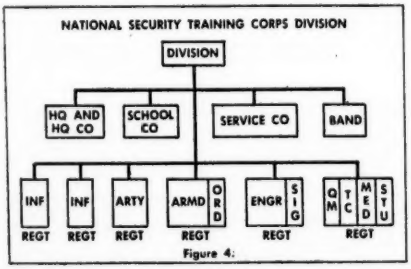


Figure 4.

head to be in addition to the authorized troop basis of the Army.

Procurement of Cadre Personnel

A major project will be the procurement of the cadre personnel. It is planned to solicit Reserve and National Guard officers meeting prescribed standards to accept long-term tours of active duty at stations of their choice, with exemption from transfer and assignment to other duty. A similar recruiting effort will be made to secure the enlistment of former service men, particularly noncommissioned officers, for assignment to stations of their choice, with exemption from transfer and assignment to other duties. Members of the Enlisted Reserve Corps will be invited to accept long-term tours of duty under the same conditions. To the extent that these programs do not meet the needs for military personnel, the Army will have to draw upon its own personnel resources for this overhead.

Selection and Training of Cadres

The selection of training cadres will be a careful screening process, to select personnel who possess the qualities of leadership, technical proficiency, and instructional ability which are required for the instruction and guidance of 18-year olds. It is planned to give each cadre a thorough course of indoctrination and training, to prepare them to meet the special requirements of this program. For this purpose cadres will be assembled at least six months prior to the time trainees must be handled.

Training Load

The training plan contemplates eleven weeks of basic training, which when combined with the two weeks "in-processing" time, will consume approximately the first three months of the camp period. This harmonizes with the Army's quarterly induction plan, in that one group will be completing basic training when the next group is indoctrinated. The personnel and

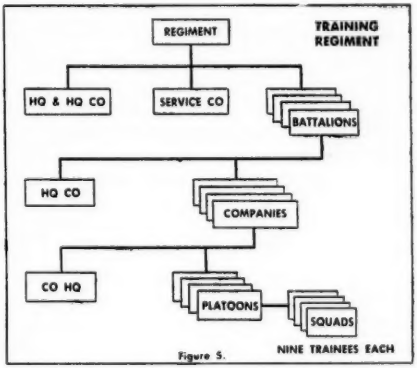


Figure 5.

equipment used in basic training will then become available to the new trainees while the earlier groups proceed to the branch and small unit phases of their training.

Those trainees who elect to remain in the National Security Training Corps for an additional six months in order to complete their training obligation will be used as cadre replacements, and given additional leadership training, or will be trained

as long-term specialists in their respective arms and services.

With an annual training intake of 432,000 trainees in quarterly increments, and consideration of the number of trainees who will elect to continue for a second six months in camp training, it is estimated that the average training load after the program is in full operation will be about 230,000 trainees.

Training Plan

The training program proper is based upon the Mobilization Training Programs for similar Regular Army units. The excellent training methods developed during the war will be employed with such modifications as further experience indicate to be desirable.

The training program is based upon a minimum forty-four hour week, of which six hours is required to be devoted to physical education, and another six hours to the trainee information and education program. The physical education and information and education programs are to be supplemented by off-duty activities in these fields. The emphasis to be given to education and individual and intra-mural athletics, and to the information and education program, is reflected by the considerable amount of space devoted to these subjects in the published plans of the Department of the Army and the Army Ground Forces. It is particularly important to examine the information and education program in more detail, since it is in this aspect of training that the essential motivation of the young American as a good soldier and a good citizen is accomplished.

The weekly six hours of duty time devoted to "I and E" is to be divided into two hours of information, and four hours of education activities. The information program will be patterned after the Army Information Program and particularly designed to inform the trainee as to the needs and the plan for UMT, and the effect it will have upon our national welfare. However, the program will not be restricted to this objective alone, but will attempt to produce a young citizen well informed concerning current events, the role of America in the world of today, and the problems facing democracy the world over.

Educational activities during on-duty hours will include at least one hour of citizenship training each week. At Fort

UMT "code of conduct" court.— Signal Corps photo.

Knox, this is the job of the chaplains who conduct a series of excellent conferences on citizenship, morals, and manners. Trainee response to these talks have been very gratifying at the experimental unit and gives promise of achieving benefits of far reaching, though intangible and long range, character, which if applied to all the young manhood of the nation, will revitalize our democracy morally and spiritually.

The other three hours per week on "on-duty time" education offers the trainee a wide choice of academic or occupational training opportunities which he may supplement, if he wishes, on "off-duty time." Included are the courses of the United States Armed Forces Institute, and a va-

riety of resident courses. All "on-duty" education activities will be supervised.

Public Information

An essential feature of the execution of the program will be the public information program. The welfare of their sons is uppermost in the minds of the people, and they will follow with critical interest the execution of the program as it affects the trainees. The army will have a large job in giving the public the full and accurate information to which it is entitled. Current plans give great stress to the details of the operation of public information activities.

Civilian Committee Interviewing a Trainee.—Signal Corps photo.

Evaluation

Lest the emphasis upon non-military activities mislead the reader into the belief that we are not going to have a real *military* training program, it is well to compare the replacement training program of World War II and the proposed UMT program. Including "in and out" processing time, the maximum time spent in training centers by soldiers in the late war was nineteen weeks. The comparable UMT period is twenty-five weeks. Considering a forty-four hour training week in wartime training centers, and applying it to the entire nineteen weeks we have 836 training and processing hours. Subtracting twelve hours a week for the UMT physical training and information and education programs we have a military training week of thirty-two hours, which multiplied by twenty-five weeks of UMT gives us 800 training and processing hours. When we consider that even the World War training programs devoted several hours a week to physical training and "I and E," it will be seen that the proposed training program has fully as many *military* training hours as the wartime program. We must consider also that these extra activities in UMT will enhance motivation, that our trainees will be a homogeneous group in an age bracket which responds most readily to good training, and that the hectic pressures of wartime will be eliminated.

UMT vs Regular Army Training

If the Universal Military Training Experimental Unit at Fort Knox, Kentucky, can be taken as a fair sample of UMT as a whole, the visitor at Fort Knox will note that the training itself is similar to Regular Army training, but that the atmosphere differs from Regular Army camp life in a number of particulars:

Trainees: More homogeneous age groups, younger than Regular Army. More responsive to training and leadership.

Disciplinary System: Relationship between cadre and trainees more an instructor-student relation. Leadership controls supplemented by a demerit system similar to that of government academies. Trainee courts assist in application of punishment by commanders, by trying minor offenders and determining guilt or innocence. Greater emphasis on education and motivation than on punishment. Tighter control of pass privileges and greater degree of regulation of "off-duty" time.

Recreational Activities: More extensive Special Service Program including improved opportunities for cultural and vocational development. Better club and

recreational facilities with greater officer participation in programs.

Medical Service: More frequent examination and inspections of greater attention to the individual's physical welfare.

Education: Increased emphasis upon "on-" and "off-duty" educational guidance and training. A greater interest on the part of trainees.

Information: More time devoted to the information program and better response from trainees.

Athletics: Wider participation by all individuals. More emphasis upon teaching of fundamentals of sport and sportsmanship.

Citizenship: Much more emphasis on development of the trainee as a good citizen.

Morals and Religion: Chaplains take more active part in over-all program and have more frequent regular contacts with trainees. Greater church attendance. Realistic approach to morals and more effective spiritual guidance.

Leadership: Officers and noncommissioned officers more enthusiastic about their jobs.

Impact on the Army

How will Universal Military Training affect the several components of the Army?

Obviously it will give the Army a big job to do—and a job in which the Army will have about as much privacy as a goldfish! The continuation of this program, so essential to our military preparedness, will depend upon public support, and that support will be forthcoming only if we approach the problem with a fresh viewpoint on training and leadership techniques, and only if we make Universal Military Training all that it has been represented to be. The job will give us a more worthwhile task than any we had in the pre-war days, and should prove interesting; it should give us a better Regular Army as a result of renewed enthusiasm and improved methods. It is fair to assume that it will increase interest in the Regular Army and stimulate recruiting.

The National Guard will be able to depend upon a steady flow of pre-trained manpower to maintain its units at planned strengths. Guard units will commence their training cycles with men who have already had more training than the pre-war guard personnel received in five or six years. This will enable the Guard to attain more advanced stages of unit training, and to reach the higher level of readiness for immediate employment in combat operations. The officers of the National Guard will face a tremendous job in conducting this advanced training. In the pre-war days the problem was relatively simple—imparting basic and branch individual training and some small unit training. With "UMT-fed" units these officers cannot waste precious training time in repetitious basic drills, but must plan and direct a much more comprehensive program. It will test their ingenuity and their abilities as leaders and military technicians.

A similar problem faces the organized units of the Organized Reserve Corps which for the first time in our history will have training facilities and equipment and a constant supply, and pre-trained manpower to work with.

If the National Security Training bill now in Congress becomes a law, the execution of the program will be perhaps the Army's most important single job. Certainly it will give us a training plant capable of prompt expansion in time of war, stronger and better trained reserve components, and above all, a *stockpile* of at least six months of *military training time*, a large segment of our civilian manpower pool.

Final signature on the National Security Act will mark the beginning of a new epoch in the military policy of the United States. The wheel will have come to a full turn and we shall have returned to the realistic system of military training employed by our Colonial forefathers.

The Legal Assistance Officer and *Army Morale*

Lieutenant Colonel James C. Davie, *Quartermaster Corps*

Colonel Davie served as President and Law Member of one of the permanent General Courts-Martial sitting in Paris, France; as defense counsel in a large number of cases; and as the Legal Assistance Officer at a general hospital.—The Editor.

ONE of the most effective and practical means for strengthening the morale of a command is the proper utilization of the services of the Legal Assistance Officer. It is singular, indeed, that many Commanding Officers either overlooked the possibilities or are not cognizant of them.

Some months ago a Major General of the United States Army made the following statement:

"The Army must convince its individual members that military service offers a career worth following. At present only 5 per cent of our enlistments come from within the Army. Too many of our soldiers leave the Army with the conviction that they have been serial numbers rather than valuable individuals in a human organization. Thus, the Army suffers too greatly in turnover, while the dissatisfied ex-soldier is a stumbling block to further recruitment among his friends." An intelligent utilization of the Legal Assistance Plan will do much toward overcoming this state of affairs.

As Army activities go, the Legal Assistance Plan is comparatively new. At the same time, it has so proven its worth that it has become a recognized and important aid to army morale. This plan was put into effect on 16 March 1943. During the years which have elapsed since its inauguration, army legal assistance officers and offices, with the assistance of cooperating bar organizations and individual civilian attorneys, have processed upwards of nine million legal and quasi-legal matters for service men and their dependents. With the advent of peace, the need for the summary and emergency expedients founded in the pressing necessities of war, and expressly or impliedly incorporated in the original Legal Assistance Plan will be greatly reduced. Cooperation by the civilian bar will still be essential to the successful operation of the plan, but that cooperation can be sought in a more orderly and generally less informal way. New procedures are gradually taking form as the Army returns to a semi-peacetime basis.

Basis for Plan

The original Legal Assistance Plan was born of the exigencies of war. It was sponsored jointly by the War Department and the American Bar Association. The official announcement was contained in W.D. Circular No. 74, 1943. This regulation provides a background for the discussion which follows.

AR 25-250 is the "Bible" of the Legal Assistance Officer. Packed into seven pages, of which only five contain text matter, are the highlights of legal assistance activities.

The most unique feature of legal assistance (to Army personnel) is the confidential and privileged nature of the service. Communications between personnel of a Legal Assistance Office and persons served are construed to be confidential and privileged in the *legal* rather than in the military sense. Only one other officer is granted similar protection—the Chaplain, whose safeguards spring from the sacred character of his religious office. AR 25-250 states this in unmistakable terms:

"Inasmuch as the service provided hereunder is essentially legal, the usual attorney and client relationship must be maintained by all concerned. Consequently, all such service and the files pertaining to the persons served will be treated and considered as confidential and privileged in the legal rather than in the military sense. Such privileged matters will not be disclosed to anyone by military personnel rendering the service, except upon the specific permission of the person concerned, and disclosures thereof may not be lawfully ordered by superior authority. Strict observance of this rule is essential to the proper functioning of the Legal Assistance Plan in order to establish confidence in the integrity of its operation, and to assure all military personnel regardless of grade or position that they may disclose frankly and fully all material facts of their case to those rendering the service, without fear that their confidence will be disclosed or used against them in any way."

The important thing is that the message must be brought home to every soldier of the command. It should be given widest publicity.

Organization Suggestions

The writer believes that an ideal arrangement would be for the Legal Assistance Office to be a separate entity from the Post Judge Advocate's Office, and in the same building or in the immediate vicinity of that of the Chaplain. Then these two officers could operate more easily when the occasion warranted it. Far-seeing officers will appreciate that at the root of many a soldier's difficulties lie domestic relations troubles. Deprived of a normal family life in many instances, the soldier and his wife are subjected to circumstances and conditions from which a civilian family is comparatively free. The Chaplain, the Legal Assistance Officer and the Post Surgeon (or preferably Psychiatrist) can often, working together, save marriages for the ultimate benefit of society and the immediate benefit to the soldier and the Army.

Incidentally, do not expect a young, inexperienced officer to make a success of this phase of the work. Marital relations cases require the advice of an experienced officer who is not only law trained but who is a profound and practical psychologist with a realistic approach to life and its problems. Young legal officers are too prone to take the easy way out by making arrangements for a divorce.

One will occasionally find an officer assigned as Legal Assistance Officer (or Acting Legal Assistance Officer) who is not interested in the work. The writer has heard more than one of this type say: "I am not going to advertise what this office can do. Let the men find me." And because the average Commanding Officer is not familiar with the details of a Legal Assistance Office, he cannot or does not 'spot' an officer of this type. Well, here is a check list, which might well be reproduced in the Post paper so that the officers and men of the command will demand those services.

Check List

"Your Legal Assistance Office will advise concerning your problems:

1. Wills (drawn or reviewed).
2. Preparation of Leases.

3. Eviction Actions.
4. Application of Soldiers' and Sailors' Civil Relief Act.
5. Insurance; Life, Automobile, Accident, Fire, etc. Except G.I.
6. Automobile and Train Accident Claims.
7. Overcharges by Common Carriers.
8. Partnership and other Business Agreements.
9. Patents and Copyrights.
10. Domestic Relations.
11. Reduction in Alimony and Support Orders.
12. Marriage and Divorce Matters.
13. Income Tax and State Tax Matters.
14. Adoption.
15. Citizenship and Naturalization.
16. Powers of Attorney and Revocation Thereof.
17. Service as Court Commissioner When Your Deposition Is To Be Taken.
18. Affidavits (prepared and notarized).
19. Immigration of Alien Wives, Children and Relatives.
20. Trust Agreements and Guardians.
21. Chattel Mortgage Problems.
22. Contracts (and cancellation thereof).
23. Obtaining Counsel in Civil Cases.
24. Protective Measures for Your Family When Going Overseas.
25. Personal Injury Suits.
26. Promissory Notes.
27. Probate Matters.
28. Change of Name.
29. Bonds.
30. State Bonuses.
31. Real Estate Transactions.

This is but a partial list. There are many other ways in which the Legal Assistance Officer can help you."

Advisory Capacity

It should not be understood that the Legal Assistance Officer will personally handle all of the multitudinous details of these matters. No, that is not his job at all. He is forbidden to appear as an attorney before a civil court, board, or commission for persons served in his official capacity (Par. 12, AR 25-250). His duty is to interview, advise, and assist military personnel and their dependents, and, in proper cases, to refer such persons to their own lawyers, to civilian counsel of their choice, or to such bar organization committees as may be appropriate and proper. In cases requiring civilian counsel, the soldier or his dependents are to have the utmost freedom in utilizing the services of counsel of their own selection. They must not be influenced at all. One of the most valuable services rendered by a Legal Assistance Officer is telling a soldier when he needs civilian counsel.

Many of the consultations which take place in a Legal Assistance Office involve money, directly or indirectly. There are exceptions, of course. The writer recalls one soldier asking for help to obtain a permit to keep a bald eagle! The soldier knew what he was talking about, however. There are a round dozen pages in the United States Code dealing with these birds. Another desired a license to raise alligators. And still another had an idea for a perpetual motion machine. All of these matters must be handled in such a manner that the soldier does not feel ridiculed. There's never a dull moment in a Legal Assistance Office.

Fields of Activity

Army Regulation 25-250 is silent concerning the *specific* fields of activity in which the Legal Assistance Officer may appropriately engage. Experience in actually operating a busy Legal Assistance Office indicates that the following are the activities usually occupying the time of a Legal Assistance Officer.

Wills. One is wise who keeps his will up to date. There are still many soldiers who executed those so-called "G.I. Wills" during the late unpleasantness, and who have forgotten about them. These tem-

porary wills should be reviewed to make certain that they express the present intentions of the soldier. Many of these wills might *not be any good* at all in certain States. Then, too, a soldier may be very ill, or about to undergo a serious operation. A Legal Assistance Officer must do the best he can under the circumstances, and draw up a will which will serve as a temporary expedient until the emergency is over.

Preparation of Leases. Officers and soldiers frequently rent properties in a town adjacent to the Post. The so-called "Military Clause" inserted in a lease of real estate may often save a military man money and trouble. The field is so wide that space prohibits further discussion under this heading, except to caution: DO NOT TRY TO DRAW UP YOUR OWN LEASE—IT IS DYNAMITE!

Eviction Actions. Now and then a landlord endeavors to evict a soldier and his family—sometimes when the soldier is absent for a protracted period. A Legal Assistance Officer knows how to deal with these individuals. Many a soldier's family has remained right where it was after a Legal Assistance Officer and one of his attorney friends in town have put the fear of the Lord in an unfeeling or callous landlord.

Application of the Soldiers' and Sailors' Civil Relief Act. This Act, which in general is effective for the war and six months thereafter, contains many measures for the protection of servicemen and their dependents by suspending the enforcement of their civil liabilities in certain cases.

Insurance. One is surprised at the number of persons who do not know what their insurance policies provide in the event of death or accident. A Legal Assistance Officer can be of service in these matters, and in the preparation of claims following deaths or accidents.

Automobile and Train Accident Cases. Soldiers are injured from time to time in accidents. Contacting insurance companies, obtaining civilian attorneys etc., may conveniently be done by the Legal Assistance Office. The Legal Assistance Officer, of course, is forbidden to appear in a court as an attorney, but he certainly can see that a soldier's rights are protected. And if a soldier is at fault, competent counsel can be obtained to defend him before civilian courts if he is sued.

Claims Against the Government. Be very careful not to permit the Adjutant to channel claims against the Government (lost baggage, stolen property, combat losses and other pecuniary individual losses for which a soldier has recourse against the Government) to the Legal Assistance Office. Section 5498 of the Revised Statutes of the United States (18 U.S. Code, Section 198) prohibits an officer of the United States, or a person holding any place of trust or profit, or discharging any official function under, or in connection with, any executive department of the Government (the Army comes under the Executive Branch of the Government, incidentally) from prosecuting or assisting in the prosecution or support of any claim against the United States. There are heavy penalties attaching to this statute. However, in the event you desire him to perform this type of work, you may do so IF you officially appoint him Claims Officer under appropriate regulations.

Collection of Indebtedness. This is one activity which the Legal Assistance Officer is forbidden to carry on. (See Par. 10c, AR 25-250.)

Partnership and Business Agreement. Advise soldiers who are about to leave the service how to protect their interests. Often-times two or more soldiers develop a feasible plan to make a few extra dollars. Men in the service are not prohibited from engaging in a little business if it does not interfere with their military duties. Perhaps they intend to make novelties or other objects in their spare time. Sound

business advice can be given men who have these activities in mind.

Patents and Copyrights. Soldiers have good ideas—don't think they do not. Military authority has provided certain regulations concerning the Government's rights in these matters, however. The Legal Assistance Office can set the soldier straight on these matters, and place him in the hands of a good patent attorney if necessary. Now and then, the Government will take care of the details for him if the idea has military value or potential military value.

Federal and State Tax Matters. Federal Income Tax Returns, State and City Tax Returns, Estate Taxes, Personal Property Taxes, and other kinds of tax matters—all are within the scope of activity of a Legal Assistance Office.

Adoption, and Changes of Name. Many soldiers have problems involving their own adoptions as well as their adoption of small children. Changes of name cases arise quite often. Portions of Army Regulations deal with name changes. Your Legal Assistance Officer is posted on the *easiest way* to accomplish changes of name, and meet army requirements, too.

Citizenship and Naturalization. Much of the work of a Legal Assistance Officer involves these matters.

Immigration. Wives who are citizens of foreign countries, soldiers' children born abroad, and relatives of soldiers present problems which when solved make a happy soldier. The Legal Assistance Office can assist in them.

Service as Court Commissioner. When soldiers are involved in legal matters and cannot appear because of military necessity or due to their confinement in a post hospital, the Legal Assistance Officer can be appointed a Commissioner of the Court for the purpose of taking depositions, etc. He can also act as the serving officer for the purpose of serving papers where personal service is necessary and the serviceman is willing to accept service.

Trust Agreements and Guardians. These matters often require the helping hand of a Legal Assistance Office. Minor soldiers may require a *next friend* or *guardian ad litem* in a particular proceeding.

Chattel Mortgage Problems. Automobiles and furniture purchases cause the most trouble under this heading. Sometimes a soldier needs a little advice when creditors are pressing him.

Obtaining Defense Counsel in Civil Courts. Soldiers are often involved in civil proceedings. They, like other citizens, are entitled to be represented by competent counsel. The latter may be recommended by the Legal Assistance Office, or reference made to Legal Aid Societies.

Powers of Attorney. Strange to say, but perhaps understandable because of man's tendency to procrastinate, there are many Powers of Attorney executed during the late war which have served their purpose, have no further use, and yet are still *effective.* Some of them are in the possession of persons who may be disposed to take action adverse to the personal interests of the maker of the Power of Attorney. Another is in the strong box (perhaps) of the girl whom one planned to marry when he "came back" but "forgot"; others may be in the hands of divorced wives, and still others just lost. A Power of Attorney is perhaps the most potentially dangerous document it has ever entered into the mind of man to conceive. Cases are not few where men returned from overseas and found that the one to whom they had given Powers of Attorney had beggared them! Tear them up you say? Suppose they are filed in the county seat or other official place of registration. Did you know that the revocation must also be filed in the same place to make the revocation effective? If that isn't done the Power of Attorney may remain in full force and effect. A good Legal Assistance

Officer can bring these facts to the attention of members of the command and prevent many a headache—to say nothing of avoiding financial losses.

Contracts and Cancellation Thereof. Very often soldiers enter into contracts and other agreements improvidently. They may commit themselves beyond their means to pay. Others may desire some advice from a lawyer before they enter into various kinds of agreements. (The latter group are the wiser soldiers, by the way!) In either case the Legal Assistance Office can prevent possible difficulty, or in the event a soldier is in difficulty, may be able to extricate him.

Probate Matters. In the event of death of a soldier or his wife or relative, the Legal Assistance Office can not only help the individual, but reflect credit on the Military Establishment by a concrete demonstration of the Commanding Officer's interest in his command. Advice can be given on how and where to file a will, how to protect one's rights in estates, and above all, how to lighten the burden of the family of a deceased.

Real Estate Purchasers. Now and then a soldier expresses a desire to purchase or build a home. Conveyance papers must be prepared, the validity of titles established, and perhaps a bit of financing done. In all of these matters the Legal Assistance Officer can see that the soldier is referred to competent and reputable persons.

State Bonus Information. Nearly everyone is interested in this one. Here is where the Legal Assistance Office can make a great many people happy. The requirements of each State differ. Complete information can be kept on "tap." Then, too, if the Legal Assistance Officer has the necessary authority under State law (see AR 25-300, 4 Jan 1946), he can execute the jurats.

Bonds. Advice on investments in U.S. Government Bonds helps the soldier to save for the proverbial rainy day, or his retirement. Programs for specific purposes may be outlined. Other investment advice goes hand in hand with this.

Affidavits. It goes without saying that affidavits are quite numerous in servicemen's affairs. A Legal Assistance Officer, if he has authority under the laws of the state in which an affidavit is to be used, can facilitate the transaction of business by not only preparing the affidavit but also administering the oath (see AR 25-300).

Protective Measures When Going Overseas. How much better a soldier feels when after he has been alerted for overseas movement, with the possibility of being separated from his family for some time, a Legal Assistance Officer goes over all of his affairs with him and sends him on his way with a light heart knowing that in the event anything happens to him his family will not be "at sea." No, these anxieties are NOT limited to periods of hostilities either!

Domestic Relations Matters. When a man has "wife trouble" his efficiency index drops precipitately. This topic was mentioned briefly in the forepart of this article. To digress for a moment, the writer is reminded of a time when a soldier came into the office and said that he wanted a divorce. When asked what grounds he had in mind he replied: "Adultery." Much to my surprise I discovered that HE had committed it. After explaining the facts of life to him, the soldier said: "I thought if you committed adultery you could get a divorce."

Conclusions

The opportunities presented to the Legal Assistance Officer for improving the conduct and morale of the command are numerous. At one of the posts where the writer was stationed, an excellent camp paper was published. In that paper was published a weekly column called THE OLD JUDGE'S CORNER. Various legal matters of general interest were

discussed. Marriage and divorce, bigamy, the theory of law, automobile liability laws of the state where the post was located, insurance, soldiers' and sailors' civil relief act, state bonus acts, wills, powers of attorney, and others. Giving the "straight dope" saved a great deal of time on individual consultations.

The writer believes that much improvement can be made along similar lines. Many a soldier has been tried for violation of an Article of War (or civil statute) when he had not been made aware of its existence or significance.

Instead of permitting a young lieutenant or captain to rush through the reading of the Articles of War, thoroughly bored with the whole thing, and trying to get rid of an unpleasant task as quickly as possible, have your Legal Assistance Officer (or Post Judge Advocate, if you will) conduct this instructional period for the entire command. Thus it will be uniformly presented, and thoroughly explained by a qualified individual. And in addition to reading and explaining the Articles of War, he could perhaps also summarize and explain laws or regulations having general application in the state and city in which the post, camp, or station is located. In the average command a large number of states are represented. It is impossible for any soldier to know the laws of the state in which his unit is located unless a qualified individual explains them to him. The writer ventures to say that there will be much less trouble with the local authorities if this suggestion is followed. And the number of trials will decrease.

Summary

1. A well-informed, diligent, conscientious, intelligent, competent and earnest Legal Assistance Officer can contribute much towards reducing the number of courts-martial cases in a command, and can strengthen the morale of the command considerably;

2. A Legal Assistance Officer with these attributes can, if properly supported by his Commanding Officer, and supplied with what he requires to perform his mission, develop into one of the most valuable members of the Staff;

3. A Commanding Officer who overlooks or ignores the possibilities of an effective Legal Assistance Office in his command is "missing the boat."

Without Universal Military Training we cannot plan for an adequate civil defense, for civil defense requires training in such things as organization, sentry duty, sanitation, transportation, first aid, patrol, disaster control, fire fighting, bomb disposal, and evacuation.

Lieutenant General Raymond S. McLain

Military Psychology—Emotions

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This is the fifth in a series of six articles on military psychology by Major Sylvester and Chaplain (Maj.) Longley.—The Editor.

COLONEL S.L.A. Marshall, the official historian for the ETO in the last war, in his book *Men Against Fire*, does a good job of pointing to the fact that successful warfare is fought not only on the level of maps and strategy and logistics, but on the level of the next lump of mud and the man behind the neighboring log.

"It is the individual soldier," Colonel Marshall says, "who, with his weapon wins wars, and who must be considered as a human being, known and understood by his fellow soldiers and his officers."

In "Factors in Human Development" (MILITARY REVIEW, December 1947), it was pointed out that we must never overlook the individual soldier's bodily and psychological makeup which determines his degree of adjustment to society, and especially to military life.

A powerful factor in the soldier's total makeup is his emotions. An emotion may be defined as a vigorous reaction to a stimulating situation. This definition distinguishes emotions from mere *feelings*, which are *mild* reactions to *mildly* stimulating situations. Taken together, emotions and feelings are what the psychologist calls *passions*. The term *passions* implies an "active—reactive" condition of the human organism, whereby the organism allows itself to be affected by the presence of certain objects in its environment (reaction), and makes its own responses to these objects according to the demands of its bodily and mental life (action). From daily experience with ourselves and with others, we know that emotional responses are accompanied by both physical and mental manifestations or expressions. For this reason, emotions are termed *psychosomatic* powers. The word, psychosomatic, is derived from the Greek words *psyche*, soul; and *soma*, body. In emotional situations, the whole human being reacts: the body (soma), and the mind and will (psyche).

The *involuntary* physical manifestations of emotions, such as the tensing of the muscles, increase in blood pressure, and dilation of the pupils of the eyes, result from the reaction of the glands and nervous system to the emotional stimulus. In fear and anger, the adrenal glands inject a hormone into the blood stream. This hormone stops internal functions such as digestion and concentrates all energy in the skeletal muscles.

The *mental* processes and the *voluntary* physical movements associated with emotions are conditioned by convention. Civilized man controls himself too well to permit these reactions to fall into a predictable pattern. A detailed technical analysis of emotional reactions is of academic interest to the military student. It is far more important for him to understand how to use and control the three emotions which the fighting man

displays most frequently—fear, anger and sex.

Fear

The emotion of fear is basically unpleasant. The fear-reaction is usually marked by an instinctive effort on the part of the subject to eliminate the fearful situation. The mental and physical energy produced by the emotional response is intended to help the frightened man to cope with the fearful situation in the best possible way; either to run away or to attack. The normal impulse is to run away; only when the mind and will of the subject are operating clearly and forcefully does he see the wisdom of attack and forces himself to act in accordance with this judgment. This is particularly true in the fearful environment provided by combat in modern war. Since the average man tends to decide that escape is the best way to handle the fearful situation, the leader must provide additional help to assist his men in forming a judgment that attack is preferable to escape, and that their fear-born energy can best be used in eliminating the enemy. Furthermore, this support on the part of the leader will go a long way toward eliminating the uncontrolled, irrational fear which leads to hysteria and breakdown. The re-direction of the energy generated by fear is achieved by the leader when he applies the following rules for controlling fear in the soldier:

(1) *Teach soldiers about fear.* A knowledge of fear helps the soldier to combat it. A certain degree of controlled fear is normal on the battlefield. Men should know why fear comes to all normal men, that it does not produce cowards, but stimulates bravery if the energy which it produces is aimed in the right direction. The worse aspect of fear is realized when men are afraid of fear itself. Once this aspect is eliminated, once men understand fear, it is not hard for them to use this fear-born energy against the enemy.

(2) *Keep men active when they are apt to be afraid,* so busy that they can not think of fear. Since action may be induced by fear, heroism and fear are often closely associated. Because a soldier is afraid, his glands and nervous system are preparing him for action. His senses are sharpened, his muscles are charged with energy. Is he going to use that energy for escape or attack? His training, discipline, and confidence in his leaders press him into action against the enemy. He plunges into the attack with a pounding heart and dry throat. Soon he finds that action is just what he needs. He soon realizes that he is doing just the thing for which his body and mind have geared him. On the other hand, when the combat activity is not sufficiently intense to drain the fighter's fear-caused energy, or if he cannot advance, he is inclined to use this energy to escape from the fearful situation. At the same time, since the soldier can do nothing to lessen his fear, he becomes frustrated. Frustration and fear then set up a vicious circle which can be broken only by renewed vigorous action.

In this connection, a photographer who landed with the troops on D-day of Operation Overlord (Normandy) said of his own efforts to crawl onto the beach: "I paused for a moment . . . and then I had it bad . . . I unhooked my shovel and tried to dig. The shovel hit stone and I hurled it away . . . I didn't think and I didn't decide it, I just stood up and ran back toward a boat." He could not advance, and when he paused, his fear-produced energy caused him blindly to run back.

(3) *Let the troops know the situation.* That a knowledge of the situation lessens fear is easy to see. It is extremely important to have all troops constantly well informed so that they will not have to guess as to how the war is going on. Guessing stimulates fear. Furthermore, the enemy, through means of propaganda devices of various kinds, is constantly

trying to misinform the troops on the progress of the war and thereby to stimulate a fear which will reduce fighting efficiency. If they are previously informed as to the truth by their own leaders, enemy propaganda will have no ill effect upon soldiers.

(4) *Make discipline a habit.* Military training is aimed at the formation of this habit. If soldiers have been well trained, the habits associated with discipline will help them carry on in spite of fear.

(5) *Keep self and men calm at all times.* Both fear and self-control are contagious. The successful commander is the man who can remain calm under all conditions. His assurance quickly bolsters the men whom he leads. When a man has to struggle to remain calm, he takes pride in overcoming his tendency to become panicky.

(6) *Remember that humor fights fear.* When the situation is tense, a laugh can be a lifesaver. During World War II, a chaplain was conducting a service for a small group of soldiers who were in a position that was relatively safe from enemy artillery. Suddenly, unexpected shells began to burst all around the group. That the flock—including the shepherd—was suddenly gripped with fear became quite apparent. The fear was almost tangible. All at once, a medical sergeant in the congregation "stagewhispered": "I hope that those blasted Jerries don't hit any of my cognac bottles." After he said this, the tension was immediately relieved and the service progressed with no further pressure than that produced by divine Grace.

(7) *When men are fighting, keep them in touch with one another.* Companionship helps to eliminate fear. One is never so afraid as when he feels that he must face danger alone. Recognizing that men are gregarious and instinctively depend on one another, the leader should deploy them so that they fight, if not within sight, at least within hearing distance of one another. There is nothing more reassuring than the presence of another man who seems not to be panicky. A solid team spirit, "group-identification," does much toward applying this rule.

In his mind's eye, the soldier *imagines* that he is in a situation with himself as center. He will be afraid, but he will be stimulated. It will be like participating in a tough team game. While it lasts, he will at least get some warmth from it, and he will be supported by the strength he feels all around him.

But it does not work out that way. Instead, he finds himself suddenly almost alone in his hour of greatest danger. He can feel the danger, but there is nothing "out there," nothing to contend against directly. It is from the mixture of mystification and fear that there comes the feeling of helplessness which in turn produces greater fear.

(8) *"Talk it up."* Colonel S.L.A. Marshall, in his book *Men Against Fire* has this to say: "Leaders must talk if they are to lead. Action is not enough. A silent example will never rally men." The radio and telephone are invaluable aids on the battlefield, but they should never be used at the expense of direct contact by the human voice. The assuring voice of the leader is of prime importance in fear control.

(9) *Discuss casualty statistics with soldiers.* A frank discussion of casualty statistics lessens fright. Before D-day for Operation Overlord, General Bradley told his troops that they would have ringside seats in the greatest show in the history of the world. The price of admission, a few dead and wounded. Experience in World War II indicated that the troops engaged in the hedgerow fighting of Normandy sustained the following casualties on a typical day: .7 per 1,000 dead; 3.6 per 1,000 wounded; .7 per 1,000 mis-

sing or captured. Of the wounded, only 4 per cent died in hospitals.

(10) *Develop loyalty and a sense of responsibility.* These virtues will carry a man through a dangerous mission in spite of his fear.

(11) *Keep men physically fit.* Soldiers with low vitality easily fall prey to fear. They lack the energy to fight panic.

(12) *Take advantage of the chaplain.* Faith controls fear. Anyone who has had combat experience can vouch for the fact that religion is one of the most important bulwarks against fear and panic. Men who sincerely place their trust in God, and who rely on the wisdom of His will are ready to accept their fate. If their faith is sufficiently strong, soldiers feel that if they are going to be killed or seriously injured, such is God's will. Nothing can be done about it, so come what must.

Anger

In its physical expression, anger is the same as fear. The difference between the two emotions lies in the mental aspect, the practical judgment made by the subject. A fearful soldier normally *tends* to run away, an angry soldier *wants* to stay and fight. Since the physical aspects of the two emotions are the same, it would be ideal if the leader were able to exercise a type of "thought control" over his men which would transform the mental reaction of fear to that of anger, and thus transform the whole emotion. To do this is rarely possible, however. Men will occasionally become angry at the enemy, especially when their friends are wounded or killed. This anger motivates the men who experience it to fight effectively. It does not usually last long, however, and fear will return sooner or later. No leader can expect all of his men to experience anger all of the time. He must always be aware of the fact that most soldiers are fighting effectively because he is helping them to form in their minds and wills the judgment and resolve to use their fear-produced energy against the enemy rather than to run away.

Occasionally men will express intense anger, rage, which is harmful in that it impairs judgment and prompts the subject to act rashly rather than wisely. At the same time, rage is dangerous because it can easily be directed against the soldier's own leaders rather than against the enemy. Rage is a symptom of maladjustment or combat exhaustion, and its victim should be reassigned or evacuated.

Sex

Since they are healthy young men, the drive which results from the emotion of sex is very strong in soldiers. At the same time the circumstances of military life, to say nothing of moral tradition, make it necessary to control this urge. A man dies without food, drink, and air to breathe. No man dies because his sex drive is obstructed. The denial of this urge, however, does bring on emotional problems, especially for the soldier. These problems, if they arise, drain the soldier's energy and hamper his efficiency.

In our discussion of motivation and frustration (MILITARY REVIEW, January 1948), we pointed out that oftentimes a man who finds that a drive is impeded resorts to substitution; he redirects his impeded desire into an unacceptable channel. With regard to the sexual problem, you will find that men substitute by daydreaming and fantasy, by indulging in pornographic "art" and "literature," and by discussing the subject of sex with their companions in a vulgar way. Such practices are often accompanied by, or lead to an improper satisfaction of, the sex drive.

One of these improper acts is *self-abuse.* True, the belief that masturbation harms a man physically and is apt to make him a drooling idiot has long ago been blasted. It is equally true that such actions are most harmful because they tend to under-

mine the soldier's self-confidence. Since they are disapproved by the man's conscience, these actions make him feel anxiety and guilt. They make him feel inferior because they show him that he is lacking in self-control. The habitual victim of this practice may be harmed psychologically because self-abuse may become more desirable to him than the normal act; and the lack of self-control can easily carry over into other areas of his behavior.

Prostitution, a frequent recourse of sexually frustrated men, has the serious disadvantage of degrading the sexual relations. Also, there is the fact that it threatens men with venereal infection. Above all, this form of substitution raises conflicts with the conscience of the normal soldier. These conflicts are so harmful to the soldier's emotional balance that they destroy the effect of any temporary release and relief which he may gain from contact with a prostitute. Army Regulation 600-900 requires that in their policies on the suppression of prostitution, commanders adhere strictly to the high moral ideas of the American people.

Because it leads to many ugly social complications, *homosexuality* is a most undersirable substitute for an impeded drive. A confirmed homosexual who makes no effort to control his perversion will interfere seriously with the morale of his unit—for obvious reasons. He is the bad apple who threatens to destroy the soundness of the good ones. Other men lapse into homosexuality without ever coming to prefer this type of relation. If they are careless, even normal soldiers can become temporarily homosexual due to the restricted circumstances of military life.

Again in our discussion of motivation, we pointed out the use of sublimation as a sound way to compensate for a frustrated drive. The sublimation of the soldier's sex drive is accomplished in several ways. The obstructed urge is redirected through contact by letters with women at home, and through legitimate social contact with other women where the man is stationed. This is a partial sublimation. In addition, religion aids a great deal, partly because it reinforces habits of faithfulness, partly because as a phase of the emotional life of the soldier, it acts as a sublimation in itself. Eating, drinking, and smoking may also help to reduce the loneliness which is a manifestation of this frustration. Hard work and exercise help on the bodily side; wholesome fun helps on the mental side.

Strange as it may seem, the commander is charged with the task of settling the sexual problems of his men. This is so because a soldier who finds that his sexual drive is frustrated, works with reduced efficiency. Obviously, then, the solution of this problem does not lie in a mere suppression of the sex emotion—were this possible! For suppression itself would lead to frustration.

Although many men are of the type that can satisfactorily sublimate and adjust this emotion to their military environment, an equal number need help in solving this problem. These men require the assistance which the leader can give through: a good example; encouraging men to keep in touch with their families, wives and sweethearts; instruction in the moral code of religion; and by seeing to it that off-duty time is filled with plenty of wholesome amusements and interests. When sex is placed in its proper perspective, when bawdiness is discouraged by precept and example, when men are interested in a constructive off-duty program, sex becomes "just one of those things."

The whole question of sex boils itself down to this: It will remain a problem as long as human nature exists. Winston Churchill is reported to have expressed the opinion that sex is here to stay. For soldiers who are living in abnormal circumstances, the difficulty of frustrated sex

drives becomes more acute. A common sense approach on the part of the leader is the only solution: plenty of work and interesting recreation in off-duty hours coupled with a minimum of sex morality lectures. These formations tend more to stimulate sex drives than they do to suppress them. Far more successful is the Army's current practice of having weekly instruction on morality and citizenship as part of the regular training program. These discussions with the soldiers cover the whole field of human conduct. They are aimed at motivating the enlisted man to deport himself in a way that reflects his desire to make his standard of conduct conform to the ideals accepted by society.

Conclusions

The basic emotions of fear, anger, and sex can enhance or impair the soldier's ability to fight. Whether these emotional forces are useful or harmful depends on the discipline and sense of responsibility which the soldier has learned in training, and carried with him to the battlefield. The actual control and direction of a soldier's emotions are the product of his leader's skill.

Officers in combat must know that though their men are subject to strong emotional forces, these forces can be swayed by skillful handling. The leader's direction can veer them toward defeat or victory. It is the duty of the commander to give proper, and studiously to avoid improper, direction. Leaders must always maintain an attitude of optimism and calmness. Never must they permit themselves to display despair or lack of faith in the final victory.

The success of the National Military Establishment today—and its ability to meet any war contingency—is dependent first and foremost upon the number and quality of its personnel. Neither the atomic bomb, nor the jet and rocket planes, nor the guided missile, nor any other development indicates otherwise. Men are not able to do their best without the aid of machines, but machines are able to do nothing at all without the aid of men.

Secretary of the Army Kenneth C. Royall

THE MEDICS also HAVE SUPPY PROBLEMS

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DURING World War II, between 1 January 1942 and 1 January 1946, over a million man-years were lost through sickness or injury in an Army with a mean strength of approximately six million men. It is the job of the medical service to reduce this loss. One of the necessities to do this job is the provision of adequate medical supplies and equipment. This article deals with three logistical problems which have been particularly troublesome to the Medical Department and which should be of interest to others.

Problem I

The first problem can be called: "Assemblies, Why Won't They Stay Assembled?" Almost all field medical equipment is furnished in the form of assemblies. The medical officer has his kit with a dozen or so items; the dental officer has his chest with several hundred items; and the hospital has its unit assembly consisting of thousands of items. It is with this large assembly that the trouble occurs. The equipment of a 1,000-bed general hospital, communications-zone type, comprises 2,614 items, weighs approximately 112 tons and occupies 17,417 cubic feet. This type of equipment is not mobile, and has to be issued to the unit at or near the spot where it will be used. The solution sounds simple—assemble and pack all the equipment in a depot in the Zone of Interior, move it to a port, transport it on a ship to the theater of operations, and finally unload it and move it to the site. However, in no instance in the last war was this procedure completely carried out.

Because of procurement difficulties, The Surgeon General had trouble getting the medical items together. In the early days there were many serious shortages. As time went on and deliveries improved, shortages became fewer and less important in nature. The Surgeon General was not authorized to include the equipment of other technical services so as to fabricate the complete assembly in a medical depot. Initially the equipment of the various services was gathered together at the port of embarkation. When it was discovered that this did not work, the job was delegated to Holding and Reconsignment Points, but it was never satisfactory. The reasons were many, but most of them stemmed from the fact that various depots over the country shipped material to the Holding and Reconsignment Point with "force markings."

The Holding and Reconsignment Point was faced with numerous documents, numerous box number "ones," "twos," et cetera, and with numerous shortage lists. To assemble, re-mark and redocument these into a cohesive whole presented a problem almost incapable of solution. The result was an assembly which was incomplete, poorly marked, and poorly documented.

Next came the movement to the port of embarkation. The assembly would be loaded in several freight cars and dispatched in one train, but the cars frequently arrived at the port on different days. This created a problem at the port to reassemble the equipment and to check carefully that it was complete prior to shipment overseas. The New York Port of Embarkation and the San Francisco Port of Embarkation, through which most of these assemblies passed, developed elaborate, but effective systems to insure that no mistakes occurred.

The problem of shipment overseas was next. In the early days of the war, assemblies were split between several ships, arriving overseas at different times and often at different ports perhaps thousands of miles apart. Naturally, these assemblies were never pulled together again. This was corrected, but in the heat of the European Campaign, several hospital assemblies were shipped through a port unfamiliar with the problem. Split shipments resulted. Some ships landed in England, others in France, and others rode at anchor in the English Channel.

Assuming, however, that the assembly reached its overseas destination on one ship, the theater had the problem of getting it to its site, often with a necessary storage delay en route. This was solved by putting guards on the train, or on the truck convoy to insure that the assembly was kept intact. In case a car or truck broke down, one guard remained with it to see that it went through as soon as possible.

The answer to the problem: "Assemblies, Why Won't They Stay Assembled?" is simple, but it requires the establishment of a definite procedure and its proper execution all along the line:

1. Charge the Chief of Technical Service (The Surgeon General in this case) with the responsibility for assembling in one place, marking and documenting the unit assembly, including equipment of all services.

2. Charge someone, preferably the same Chief of Technical Service, with the responsibility of guarding the shipment from the assembly depot to the port.

3. Charge the port with responsibility for loading the assembly on one ship and preferably in one hatch.

4. The theater commander should charge someone with responsibility for keeping the assembly intact until actually turned over to the using organization.

Problem II

The second problem can be called: "The Logistical Paradox," or "The Smaller the Item the More Difficult It Is to Move." This problem is peculiar to theaters of operation. When transportation is available, rations, gasoline and ammunition move from the rear forward without difficulty, while spare parts, medical items, signal items and other items of small bulk tend to be left behind. Why is this, and what can be done about it? Again the reasons are varied, but perfectly understandable. The agencies concerned with transportation, G-4 and the Transportation Corps, tend to emphasize tonnage and to minimize items. Most of their reports of performance are built around tonnage. There is never enough transportation to move everything which should be moved, so there is a tendency all along the line to move things that are most easily moved. Numerous small items going to several destinations present a transportation problem not easy to solve in a theater of operations. This is an LCL (less than carload lot) and "express" business requiring careful marking and documentation, and presenting the possibility of loss en route difficult to avoid.

An example from the European Theater is illustrative. Until November 1944, front line troops were supplied from the Normandy area by the famed Red Ball

Express truck route. During this period no serious difficulty was encountered in forwarding medical supplies. As many trucks as were needed picked up supplies from medical dumps daily and delivered them to various destinations at the front. In November, however, the rail net had been reestablished, and the trucks were withdrawn for repair and for use in forward areas. G-4 and the Trasportation Corps determined that the only way in which the rail net could be fully utilized was by the movement of solid trains from one point in the rear to one point at the front. The medical service did not have a solid trainload of supplies to send to one destination, consequently, for approximately three weeks, nothing moved except the little which could be moved by air.

The solution to this second problem is likewise simple:

1. Recognize the problem before it develops and guard against it.

2. Make small, flexible units for transportation available to move supplies of small bulk and tonnage.

Problem III

The third and last problem can be called: "Where Do the Litters Go?" When a patient is evacuated from the front he is usually on a litter and wrapped in blankets. He may also have a pillow and be wearing a splint. Under the classical property exchange system, the evacuating vehicle carries a stock of these items, and upon receiving the patient, turns over the proper amount of stock to the forward unit. A similar exchange is made at the other end of the run and the pipeline is kept filled. But this system works only if every vehicle which evacuates patients, be it ship, train, ambulance, truck or airplane, carries a stock of these items for exchange. If airplanes are used to carry troops or supplies forward and to evacuate patients, the forward areas are rapidly depleted of these supplies. The solution to this problem is also simple:

1. Plan for it in advance.

2. Provide adequate quantities of the items in advance.

3. Arrange for shipments to forward areas on an automatic basis, if possible.

These three problems have been discussed to bring out certain points which, while primarily of medical interest, are also of general logistical import. In any planning for a future war, the medical services will need help from future commanders and staff officers in their solution.

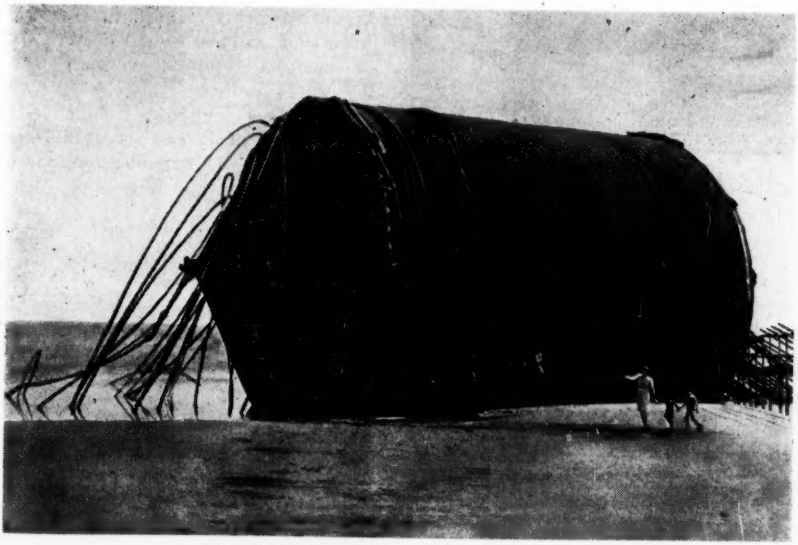
The most complete and constructive plan for a national security program has, significantly enough, come not from the military departments of the government but from a group of distinguished civilian leaders appointed as a Commission by the President of the United States to study the subject. This Commission, headed by the noted scientist, Dr. Karl T. Compton of Massachusetts Institute of Technology, and consisting of leading educators, religious leaders, and representatives of industry and labor and others, examined the problems of national security for over a period of six months from the impartial and objective standpoint we would expect from such an outstanding group. I think the Compton Commission report is the most significant writing on the security of our country that has ever been recorded.

Lieutenant General M. S. Eddy

MILITARY NOTES AROUND THE WORLD

GREAT BRITAIN

Reminder of "Pluto"



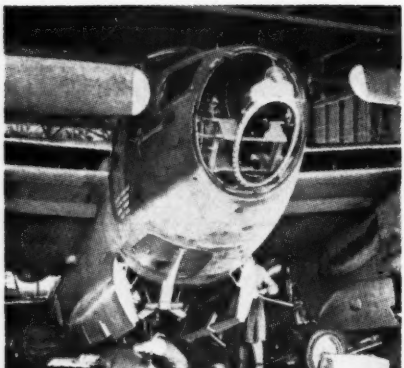
Giant Pipeline Holder on English Coast.

Still resting on the south coast of England is a giant pipeline holder, a reminder of a celebrated pipeline which fed millions of gallons of oil and fuel under the sea to the Allied invasion forces in Normandy and Brittany.

Two vessels of the Marine Salvage Company have been hauling in the line between the Isle of Wight and Cherbourg. There are 400 miles of "Pluto," each mile weighing sixty-three tons. The lead contained in the line is being salvaged for industry, and the big drum on the beach at Littlestone is expected to be removed and also salvaged.—*The Sphere*, London.

GREAT BRITAIN

Rocket Aircraft



British Rocket-Aircraft, Capable of 900 MPH, Being Installed in Mosquito Plane.

Vickers-Armstrong of Great Britain has developed twenty-four model rocket-aircraft of six types, each designed for a speed of 900 miles per hour.

In recent tests, off the Cornish coast, the first model tested was considered successful. The model used has an 8-foot wing span, a length of 11 feet, and a diameter of 18 inches. It carried 300 pounds of fuel and weighed 900 pounds. The rocket was put into action at a height of 36,400 feet.—*The Sphere*, London.

Jet Bombers

The Ministry of Supply reveals that orders are being placed for two jet-propelled bombers. The first, on which work was started two and a half years ago, is a twin-jet medium bomber, and the second, with four jets, commenced a year ago, is a heavy bomber incorporating a novel wing shape.—*The Aeroplane Spotter.*

ARGENTINA

Uranium in Oil

The National University recently announced that its research scientists had found uranium in crude oil extracted from the Tupungato wells. It is believed that this is the first time that uranium has been found in oil. The initial research by the university was aimed at tracing uranium in asphalt.—*United Press.*

Aviation News

In addition to the news about the Argentine *Pulque*, the first jet aircraft built in Latin America, it was announced recently that Britain has supplied the Argentine Army with a number of the latest-type clipped-wing Gloster *Meteor IV* twin-jet fighters, powered by two *Derwent V* units.

Rolls-Royce engineers from Britain went to Argentina and set up a *Derwent* jet engine at the Argentine aeronautical

Argentine Gloster Meteors.

expositon. They consulted with engineers of the Instituto Aerotecnico regarding installation of the jet in the *Pulque* and operational and maintenance problems of the *Meteor.*—*Aero Digest.*

GERMANY

Tank Defense

The following are German rules of tank defense for armored forces.

If long-range antitank fire is encountered, halt and fire. Only the tank under fire seeks shelter. Others halt and fire. On the sudden appearance of an antitank gun at short range, fight. To halt or turn back is wrong—not least of all for psychological reasons—unless there is shelter nearby. Normally, one does not fire during a change of position. In a bad situation, fire with everything to hold down enemy fire. At the same time, bear down at top speed on the gun. Do not advance without fire protection. If you do not have artillery support, protect yourselves with your own fire, certain tanks being assigned to fire protection. A tank either observes, fires or moves.—*Allgemeine Schweizerische Militärzeitung.*

German Helicopter

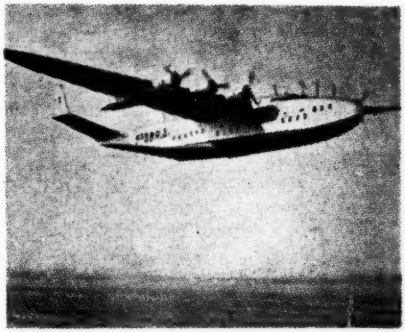
A German helicopter, the Flettner 282, has been brought to the United States for testing. The machine was built by the

German Helicopter, Flettner 282.

Germans for artillery observation. The United States Air Force is determining if the German design contains any features worth incorporating in American models. —*The Sphere,* London.

FRANCE

French Flying-Boat



Latecoere 631 Flying-Boat.

The new French flying-boat "Latecoere 631" recently made a demonstration flight to England. Construction began on the flying-boat in 1938 and the craft was almost completed when the Germans invaded France in 1940. It was secretly dismantled and the parts hidden all over France until the liberation, when it was again assembled. The six-engine "Latecoere" is the largest flying-boat to be built in Europe. It has a wing span of 188 feet, is 142 feet in length, and 34 feet high.—*American Helicopter.*

German Ships

France has been advised by the United States that the latter will transfer to the French Government thirty-one former German naval ships and a 40,000-ton floating dock that previously belonged to Germany. The ships were awarded the United States by the Postdam Conference.

The vessels include three destroyers, one aviation supply ship, one aviation repair and maintenance ship, one depot ship, twelve mine sweepers, three trawlers, one tanker, seven sea-going tugs, and two torpedo transporters.—*The New York Times.*

ECUADOR

Aviation Service

The Minister of National Defense has granted a contract to Skyways International Trading and Transport Company to make at least three scheduled monthly trips through Ecuador, with stops at Guayaquil and eventually at Quito. The airline now operates in all of the west coast countries of South America.

Latin American Airways, Inc., an American company formerly called West Indies Flying Service, Inc., has also established service in Ecuador. Connecting with international routes, it carries passengers, mail, and cargo to Quito, Guayaquil, Manta, Esmeraldas, Salinas, Loja, Cuenca, Riobamba, Ambato, and Ibarra. During a national emergency, Latin American Airways must put its service at the disposition of the Government.

The contracts granted to both companies require that they must employ Ecuadorean co-pilots and office and maintenance employees.—*Bulletin of the Pan American Union.*

CHILE

Chilean Aviation

The development of Chilean aviation is recorded in an official Aeronautical Museum recently opened in Santiago.

One part of the exhibit contains twenty-four plane models, built to scale, representing the types used by the Chilean Air Force since its founding in 1913. Another exhibit contains souvenirs of both military and civil aviators. Among the latter is a gold sword presented to Dagoberto Godoy for crossing the cordillera from Chile to Argentina for the first time on 12 December 1918.

Among historical propellers in the collection is one from the machine used by Morane Parasol, with whom Figueroa crossed the cordillera in 1921 on the first international air mail flight out of Chile.—*Bulletin of the Pan American Union.*

SWEDEN

Central Asia Maps

It was recently announced in Sweden that the United States had acquired the outstanding maps, photographs and sketches of central Asia compiled by the Swedish explorer, Dr. Sven Hedin.

In Washington, the Department of the Army confirmed that Dr. Hedin had furnished notes, drawings and geographic data for a number of maps now being drawn by the Army Map Service. Dr. Hedin will obtain European publishing rights to the maps.

The maps are described as covering Asiatic areas from the Yellow Sea in the east to Russian Turkistan in the west, and from Hungary in the north to Himalaya in the south.

The material for the maps was at Gotha, Germany, for publication, when the war stopped the work. The German publisher hid them during the war, but they were found by US occupation forces and taken to Washington.

The maps are the result of Dr. Hedin's expedition with Danish, Swedish, German and Chinese scientists in Asia from 1927 to 1935.—*The New York Times.*

NORWAY

Underground Plant

A subterranean power plant invulnerable to air attack is being planned in Norway by the Vinstra Power Company of Oslo. The plant will be blasted out of a mountain at a depth of 3,000 feet and will be the first of its kind in the country. Water will be channeled to the generator room through a conduit more than fourteen miles long. The plant will have a power of more than 180,000 kilowatts. Preliminary work on the project already is under way, and it is scheduled to be completed by 1954. Cost of excavation alone is put at $5,925,000.—*Coast Artillery Journal.*

BURMA

British Burma Treaty

Under a treaty signed in October, Britain withdraws all troops in Burma, but receives exclusive rights to maintain a joint military mission. Terms of the treaty were to become operative in January, after passage of the Burma independence bill.

The size of the military mission was not revealed. The defense agreement, however, is to remain in effect for three years, and is subject thereafter to a twelve-month cancellation notice. Military aircraft of both nations shall enjoy the peacetime right to fly over the territories of the two countries and shall have staging facilities at prescribed airfields.

Burma is to give all possible facilities and assistance to transportation of Commonwealth military in time of war or approaching war. Britain is to provide financial and physical assistance in maintaining Burmese airports. Burma receives thirty-seven small naval vessels and an unspecified quantity of military material, including aircraft in Burma at the time the treaty was signed.—*The New York Times.*

USSR

New Airplanes

Six new ultra-modern types of airplanes were displayed at the annual air force exhibition in Moscow. Jet planes included in the show were Yakovlevs, Sukhovs, Mikoyans, Ilyushins, Tupelevs and Lavochkins. A seventh jet, not displayed at the exhibition, was a plane designed by Gurevitch.

There were two Ilyushin models among the jet planes, and also three new types of four-engine transports.

The air exhibition included a mock air battle, a mass parachute jump by 500 parachutists, delayed parachute jumps, and formation flights.—*United Press.*

AUSTRALIA

Navy Strength

By 1952, Australia will have the largest peacetime Navy in its history. By that time, Australia's five-year expansion plan will be completed, and the Navy will have twenty-six ships in commission, and a reserve of eighty other vessels. Personnel will number 14,753.—*Australian News Summary.*

SPAIN

Arsenal Explosion

Widespread damage resulted from the disastrous explosion at the Naval base arsenal at Cadiz on the night of 18 August 1947. The blast apparently centered in the torpedo factory and shipyards of the historic port. Many of the 800

persons unofficially reported killed by the explosions were workers in the torpedo factory. A large oil tanker under construction was also smashed. The city of Cadiz suffered considerable damage, and the total losses were approximately $25,000,000.—News reports.

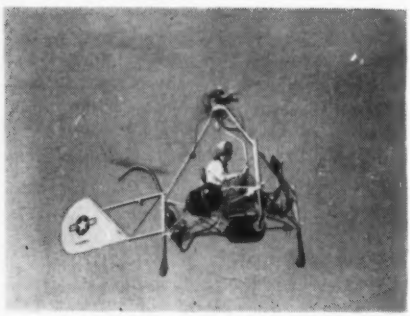
JAPAN

CPX by I Corps

The staff of I Corps, which is occupying Southern Honshu and Kyushu, held a three-day command post exercise in field headquarters at Fukuchiyama during October. The problem involved defense against an invading force striking from the west and establishing beachheads in Wakasa Bay, with the objective of driving across Honshu and cutting Japan into two parts. The staffs of the 24th and 25th Divisions also took part in the exercises. —*The New York Times.*

UNITED STATES

Ram-Jet Helicopter



Ram-Jet Helicopter in Flight.

The world's first ram-jet helicopter is this US Air Force craft, weighing only 310 pounds. It can lift 300 pounds with its two ram-jet units which weigh only

310 Pound Craft has Two Ram-Jets.

ten pounds each. It is ideal for short-range observation, communications, artillery spotting, and courier service.—USAF photo.

Automatic Weather Reports

Automatic weather reports, originating from thousands of isolated and widely separated stations from the Arctic to the Antarctic, will serve weather bureaus for future forecasting.

The stations, a few of which are already in use in both frigid and tropical climates, need no attending crew, and will report automatically by radio at regular intervals in code. Maintenance crews must visit the stations only at intervals of approximately two months.

Development of the reporting system has been through cooperation of the US Weather Bureau, the National Bureau of

Automatic Weather Station.

Standards, and the Army and the Navy. Work on the idea was started as early as 1935, and the first operating model was completed in 1941. Several of the stations were placed in operation in the Pacific the following year.

In the case of radiosonde equipment, battery power is sufficient for operation. But land-based stations require electric generators driven by gasoline engines, capable of operating for about two months without attention. A special housing unit, eight feet square, has been designed for the station.—*Science News Letter.*

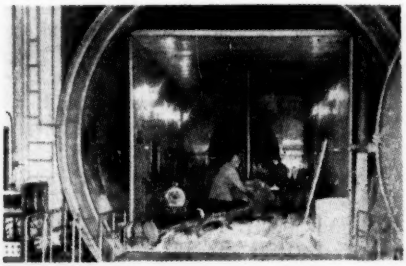
Water in the Arctic

In planning for recent cold-weather operations, the technical staff of the Engineer Board made a design for a snow and ice melter which would produce 50 gallons of water per hour when operating at 50 degrees below zero fahrenheit.

In June 1946, the Board was authorized to procure two of the 50-gallon melters and two 500-gallon melters, for experimental and test purposes.

Mounted on skids, with hardwood runners, each of the units consists of an inner melting chamber, a combustion chamber, and an outer water jacket. Circular gasoline burners of the pressure atomizing-vaporizing type are used.

In operating, ice or snow is fed into the melting chamber through an insulated

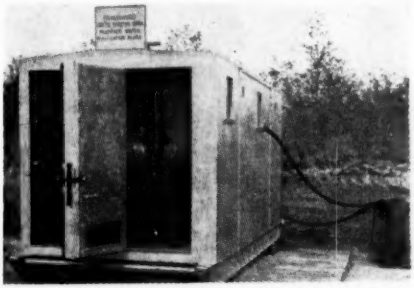


Large Ice and Snow Melter.

door in the top of the unit. Best results are obtained when the ice is crushed to a maximum size of four to six inches before it is shoveled into the melter.

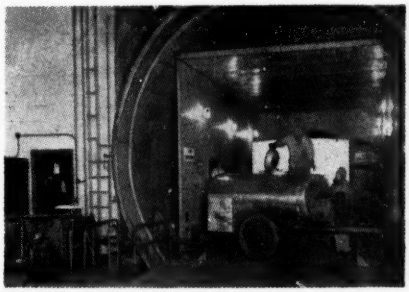
Operations also indicated the need for a winterized water purification plant so such a plant was developed. It consists of a heavily insulated skid-mounted shelter in which a modified 50-gallon per minute filter has been installed. The water pump and hypochlorinator are run by electricity, generated by a gasoline-engine generator in the shelter.

Another piece of equipment developed for arctic winter operations is a modifica-



Winterized Water Purification Plant.

tion of the standard Ordnance 250-gallon water tank trailer called "Bert, Jr." It will provide a special winterized unit to use in the treatment, filtration and distribution of water in extreme low temperatures. At the rear of the tank, a compartment has been fabricated for installing a Vapor-Car engine coolant-type gasoline-burning heater, with two filters, and a hand-operated pump. Whether left on its wheel mounting or placed on skiis, the wa-



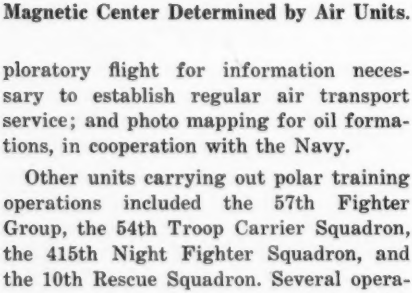
"Bert, Jr." — Winterized Water Trailer.

ter tank trailer can be towed by a "Weasel" or other tracked-prime mover for field operations.—*The Military Engineer.*

Polar Navigation Problems

Operations over the last year by Alaska-based squadrons of the United States Air Force have proved that USAF units can fly anywhere in the polar regions during any season of the year.

The 46th Reconnaissance Squadron began operational missions from the base at Ladd Field, Fairbanks, in July, 1946, and in the following year flew more than 5,000 hours and 1,000,000 miles to test material and personnel. Its long-range project was to observe and photo-map the Alaskan area for strategic location of defense installations. Other projects included exploratory flight for information necessary to establish regular air transport service; and photo mapping for oil formations, in cooperation with the Navy.



Magnetic Center Determined by Air Units.

Other units carrying out polar training operations included the 57th Fighter Group, the 54th Troop Carrier Squadron, the 415th Night Fighter Squadron, and the 10th Rescue Squadron. Several operations were carried out in cooperation with Army Ground Forces, testing ground equipment and the mobility of troops in air.

One of the most interesting studies in terrestrial magnetics was the actual location of the magnetic north pole. In more than 1,000 variation readings, the magnetic field was determined to be elliptical in shape, consisting of three poles. The major pole was determined to be on Prince of Wales Island, with two local poles on Bathurst Island and Boothia Peninsula.

Formerly the location of the pole was given as the lower tip of the ellipse on Boothia Peninsula. The center of the field was located 1,750 miles northeast of Ladd Field.

Various studies and experiences will prove valuable in future polar operations:

A system of reference-heading navigation which was worked out enables planes to fly anywhere and know their location to within one mile.

Discoveries of weather phenomena were innumerable. Polar weather, to pilots, "looked worse than it was." Air was mostly stable and the greatest hindrances were fog, snow, or ice haze. In winter, there were few clouds, no thunderstorms and little icing; in summer, it was nearly always cloudy. Flying was held to a minimum during the fall and spring because of the hazards of flying in continual twilight.

Temperatures frequently indicated ninety degrees warmer air at 3,000 feet altitude than on the surface. In winter, it was warmer at the North Pole than at Ladd Field. Very strong winds were prevalent, and one mission encountered a cyclone over the polar cap with 100 knots wind velocity.

In operating the units, it was found that much of the standard type ground equipment was inefficient in the cold climate. Transportation was hampered by snow and terrain, which made servicing of units difficult. Pipelines were needed to move large quantities of fuel, as well as an improved railroad and highway system. —Department of the Air Force.

High-Speed Missiles

Reports from the flight propulsion research laboratory of the National Advisory Committee for Aeronautics at Cleveland reveal that unusual progress has been made in the United States in production of high-speed missiles, aircraft and power plants.

After the recent announcement that British scientists had reached a speed of 800 to 900 miles per hour with a robot plane, the Cleveland laboratory reported that "two years ago we first got beyond the speed of sound—to 80 per cent above the speed of sound, or about 1,000 miles an hour—with a similar device, but one fired from the ground rather than dropped from an aircraft. By that more difficult method we soon thereafter got to twice the speed of sound or into the neighborhood of 1,500 miles per hour."

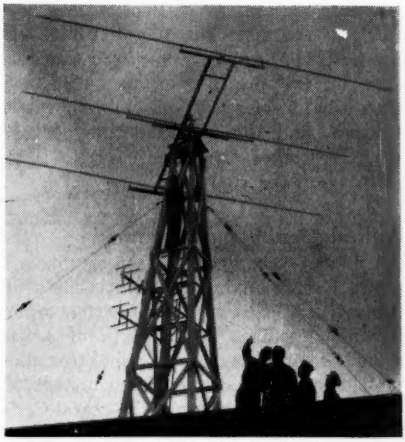
Research at the laboratory has already answered the basic questions posed by the introduction of jet and turbine engines into the air. In the matter of materials, various devices have now brought within the reach of achievement a turbine wheel that can revolve some ten times faster than a reciprocating engine and at temperatures twice those usable in the original jet engines. Fuel experiments have produced fuels some twenty times more efficient than the customary fuels.

Originally intended for reciprocating engines, the laboratory is now converted for study of jets and turbines.—*The New York Times.*

Mechanical Know-How

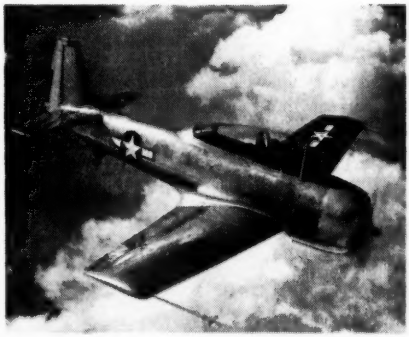
The mechanical know-how, which was found during World War II to be so important to success as an airplane pilot, is a combination of four independent abilities, according to the Office of the Air Surgeon. Pilots must have an aptitude for mechanical work, be handy with words, be able to use mechanical devices, and know physics.—*Science News Letter.*

Rotating Antenna



A Signal Corps device for constant radio contact with aircraft is a rotary beam with receiving and transmitting antennas which follow aircraft in flight. —USAF photo.

Navy Training Plane



The XSN2J-1 has a top speed of 270 miles per hour. It is a low-wing, all-metal, two-place plane, with tail hook for carrier training.—Navy photo.

Miscellaneous Notes

Antarctic Expedition

A small Navy expedition of two ice-breakers and approximately 450 men left late in 1947 for the Antarctic to continue some of the projects of the 1946-1947 expedition. The expedition will visit Little America, and further study the "oases" of ice-free lakes discovered early in 1947. —*Science News Letter.*

Unified Caribbean Command

A unified command has been established in the Caribbean by the Joint Chiefs of Staff, with Lt. Gen. Willis D. Crittenberger in command. This is the sixth of seven unified commands announced after the passage of the National Security Act of 1947. As commander-in-chief, General Crittenberger has been assigned all US forces in the Caribbean and the Panama Canal Department, with the exception of the fleet facilities and fleet bases at Roosevelt Roads, Trinidad, and Guantanamo, and the fleet air wings and fleet vessels temporarily in the Antilles.—*Armed Forces.*

Arctic Equipment

New, restricted Army equipment was tried out in the far north the past winter by a Transportation Corps detachment.

The equipment was developed by the Transportation Corps Board under the staff direction of the Engineering Division, Office of the Chief of Transportation.

Each member of the detachment was a highly skilled specialist. The group included engineers, machinists, mechanics, and radio repairmen from various components of the Army.—*Armed Forces.*

Mapping Lag

The United States Geological Survey reports that less than half of the United States has been mapped topographically, and less than a quarter adequately for modern requirements.—Associated Press.

Permanent WO Corps

The Department of the Army and the Department of the Air Force have started a 5,000-man procurement program for a permanent Warrant Officer Corps which offers permanent warrant officer status to qualified enlisted men through competitive examinations.—Department of the Army.

Super Antenna

The Navy plans to construct the world's largest radio antenna, two miles long and one mile wide on steel towers more than 800 feet high, near Seattle, Washington. It will provide communications for naval defenses in Alaska, the Aleutians, and the Pacific Northwest.—*Science Digest.*

Supersonic Tests

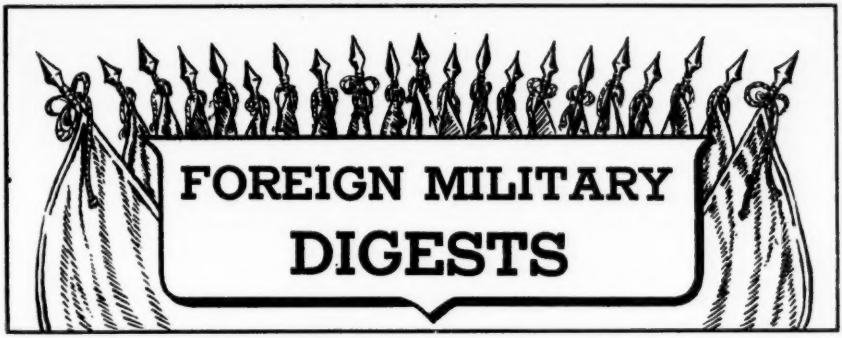
Supersonic speeds up to 7,000 mph can be simulated by towing models through a water channel filled to a depth of only one-quarter of an inch, in a new water tunnel developed in the North American Aviation's Aerophysics Laboratory.—*Science Digest.*

Universal Military Training

A summary of the more important aspects of the report of the President's advisory commission on universal training (UMT) has been issued in reprint form by *Army Information Digest*, Army Information School, Carlisle Barracks, Pennsylvania.—*Army Information Digest.*

Energy Detection

Using a sky-observing variation of the wartime snooperscope, sniperscope and infra-red signaling devices, American astronomers have discovered that the sun produces much more energy than might be expected from its supposed temperatures.—*Science News Letter.*



The Battle of Kursk

Translated and digested by the MILITARY REVIEW from an article in "Kungl. Krigsvetenskaps-Akademiens Handlingar och Tidskrift" (Sweden) No. 6, 1947.

THE battle of Kursk, in July 1943, is of interest as it was the last great German offensive in the east during World War II. The German failure at Kursk also forecast the final defeat of the German army. After this offensive, the Germans never regained their strategic initiative on the eastern front.

In contrast to 1941 and 1942, neither of the contending sides had any doubts as to where the heavy fighting would occur in 1943. For several months before the Germans set the 1943 offensive in motion, interest on both sides had been directed toward the so called "Kursk salient." The city of Kursk, situated on the north bank of the Seim river, is an important railway junction point. West of the city, the front jutted out in the form of a bow, forming a salient. To the Russians, this area was suitable as a starting point for an offensive toward the west; to the Germans, the possibility existed of cutting off the salient by a pincer operation with pressure applied on the north and south. By so doing, the Russian forces grouped within the salient could be trapped and crushed. Both sides, therefore, during the spring of 1943, assembled strong forces west of Kursk, and this was well known to both sides.

Because of the heavy losses which the Germans suffered in the fighting in Russia in 1941 and 1942, it was not possible in 1943 to set major offensives in motion at several different points. It was necessary to limit themselves to a single, large operation, and the choice fell on the Kursk salient.

In the spring of 1943, the Germans were in a position either to seize the initiative, or to leave this to the enemy, check the attack and go over to a counter-offensive. It was understood by the German high command that the Russians also were preparing an offensive. The Germans decided to begin the attack themselves. The reason for this was that the Germans hoped to deal a blow against the adversary while the latter was still occupied with preparations. The German high command believed that the Russian defense was not complete and that if they attacked immediately the Russians could be easily crushed. The German communique at the beginning of the battle of Kursk said that the Germans had "gotten the jump" on the Russians and that the latter had been surprised in their defensive preparations. But the Russians, who had decided in the case of a German attack on Kursk to first stop the enemy and

then counterattack on Orel in the north, and on Belgorod and Charkov in the south, were by no means surprised. They had taken very complete defensive measures, especially in the northern and southern parts of the Kursk salient, where they most expected the Germans to attack in an attempt to carry out a double envelopment.

The result of the battle of Kursk was that the German attacks were held, both in the north and south. After this, the Russians seized the initiative. The battle of Kursk changed over, then, to the battle of Orel, in the northern sector, and the battle of Charkov and Belgorod in the south. During these operations, the Germans were hurled back with great losses.

Soviet Account

The fighting in the Kursk area has been described in *The Battle of Kursk* published by the Historical Section of the Red Army and intended for study by the generals and officers of the Red Army.

This book contains a brief account of the course of the battle and certain lessons and conclusions. Both the account of the battle and the lessons drawn from it are, however, considerably abridged.

The contents of the book are, as is the case with nearly all Russian military literature, strongly propagandistic. In the text, therefore, digressions often occur in which the troops' fidelity to both country and command are praised.

The Germans began preparations for the Kursk attack as early as March 1943. At the beginning of the summer, three armies were engaged.

German Forces

The Ninth German Army was grouped in the Orel area in the Bogoduchov-Sevsk sector, with the mission of taking Kursk by means of an attack from the north. For the attack on the city from the south, the Fourth Armored Army was grouped on the line: Krasnopole—Voltshansk. The Second German Army between the two shock armies was to hold the Russian forces over a 200 mile front, on the line: Sevsk—Krasnopole.

In the direction of Orel-Kursk, the Germans engaged seven armored, two motorized and eleven infantry divisions. The main formation intended for the attack on Kursk from the north was concentrated in the Glasunovka-Tagino sector. Very considerable forces from the Ninth Army were concentrated there over a stretch of thirty-two kilometers. These forces consisted of five infantry, six armored and one motorized division.

In this formation were included the XLI and the XLVII Armored Corps with a combined strength of 1,500 tanks, a large proportion of which were of heavy type ("Tiger"), and 3,000 pieces of artillery. On each kilometer of front some 4,500 soldiers, forty to fifty tanks and seventy to eighty pieces of artillery were engaged.

Of the German forces at Belgorod (the Fourth Armored Army), the armored corps from the Elite Guard, and the XLVII and the LII Armored Corps were to conduct the main attack along the Belgorod-Kursk highway, against Oboian. The main body of these forces—ten armored and seven infantry divisions and one motorized division, with a total of 1,700 tanks and 2,000 pieces of artillery, were grouped along a front eighty kilometers wide. There were also detached, for the attack along the Belgorod-Oboian highway, six armored and two infantry divisions. The German forces which were to execute the main attack from the south amounted to some 3,000 men, forty-two tanks and fifty pieces of artillery per kilometer of front.

Through captured prisoners, the Russian command received the information that the Germans counted on being able to close the pincers and take Kursk by 9 July, or the fifth day after the beginning of the offensive.

Russian Preparations

The Russians had prepared a deep defense for meeting the German attack. The depth of this defense, in the Kursk salient, exceeded one hundred kilometers, in some directions. The area was filled with firing trenches connected by communication trenches. Every large inhabited place was organized as a defense area, with strongpoints. The defense had been made particularly deep in the direction from which the German attack was most expected. During May and June, the Russian troops dug several thousand kilometers of rifle and communication trenches and planted some one hundred thousand antitank and antipersonnel mines and constructed obstacles over a combined distance of one hundred kilometers. Approximately 2,000 antitank and 1,700 antipersonnel mines were planted per kilometer of front. Within the space of the defense area occupied by one division, seventy kilometers of rifle and communication trenches could be counted. The idea of mounting a counteroffensive was dominant in the elaboration of the defense plan.

On the morning of 5 July, the Germans unleased their attack on Kursk, from both the north and south. The battle in the north continued from 5 to 17 July. The attack was executed there over a front of some forty kilometers, and the Germans succeeded in forcing their way from ten to twelve kilometers into the Russian positions. The main German formation pushed in the direction of Olchovatka, by way of Pochvalnoe and Tagino. The intention was to effect a breakthrough and reach Kursk by the shortest route.

The German Attack

In order to protect the flank of the formation, the XXIII Army Corps was to move toward Maloarchangelsk and the XLVI Armored Corps, from Tagino in the direction of Gnilets. In the attack on Olchovatka, more than 500 heavy and medium tanks were engaged. In the first attack wave, the heavy tanks of the "Tiger" type advanced in groups of from ten to fifteen together with assault guns of the Ferdinand type. In another attack wave, came the medium heavy tanks in groups of some fifty to one hundred. These advanced with great speed, followed by motorized infantry on armored, caterpillar tread vehicles. The attack was supported by powerful bombing aviation.

The German tanks, which suffered losses by the Russian artillery fire, did not succeed, for a long time, however, in breaking into the first lines of the Russian defense. The first four attacks were fruitless, and it was not until the fifth attack that a small number of tanks succeeded in breaking into the Russian positions. By the end of the first day of the attack, the main German formation on the northern front had succeeded in penetrating the Russian positions only six to eight kilometers. The forces which were advancing on both sides of the main formation for the purpose of protecting its flanks likewise failed. The relatively unimportant tactical advance achieved by the Germans at Olchovatka was won, according to Russian figures, at the cost of 15,000 men, one hundred tanks and 106 planes.

On the following day, 6 July, the Germans renewed the attack, after having brought up reserves during the night. The attack of the first day, however, had resulted in such heavy losses that the Germans found themselves obliged to reduce the breadth of the attack front. All their forces were engaged, therefore, against Olchovatka.

Counterattacks

But, simultaneously, on 6 July, the Russians went over to a counterattack and, for this reason, the fighting that day was characterized by a furious attack from both sides in which violent battles occurred between German and Russian armored formations. The German losses that day, according to the Russian figures,

were more than 10,000 men, 110 tanks and 113 planes.

On 7 and 8 July, the Germans again attempted to break the Russian defense and push in the direction of Kursk by an attack directed against Olchovatka and Ponuru. The most violent fighting in this action occurred at Ponuru, which the Russians had organized as a powerful defensive area to prevent a drive on Kursk along the line of the railway which passed through this city.

In the afternoon of 7 July, a German tactical breakthrough was effected in the northern part of the Ponuru area, but on the morning of 8 July, the Germans were hurled back again by a Russian counterattack.

After 8 July, the Germans gained no more ground on the northern front. On 15 July, the Russians, strongly supported by artillery, began there a powerful counteroffensive, as a result of which the Germans were hurled back to their starting point.

The German command had meager reserves to throw into battle. They did not dare risk taking forces from other parts of the front for fear of a Russian relief attack above the Kursk salient, north of Orel. While these operations were going on in the north, violent fighting raged in the southern part of the Kursk salient. The fighting along the axis, Belgorod-Kursk, was taking place on a front of some 100 kilometers breadth and over a depth of thirty-five kilometers. It continued without interruption for twenty days—from 4 to 23 July.

The main German formation in the south, the Fourth Armored Army which consisted of the XLVII Armored Corps, the armored corps from the Elite Guard and the LII Army Corps, advanced to the attack in a northerly direction along the Belgorod-Oboian highway in the attempt to reach Kursk by the shortest route.

Another German formation, composed of the III Armored and the II Army Corps, moved forward from Belgorod in the direction of Korotian.

On the Krasnopole front, fifty kilometers west of Trefilovka, two infantry divisions from the Fourth Armored Army attacked.

The Southern Front

The fighting on the southern attack front was begun in the afternoon of 4 July by the Germans who, after only ten minutes of artillery preparation, went over to the attack at 1600 with one infantry division supported by one hundred tanks. The fighting continued throughout the entire night, and on the morning of the following day reinforcements were received. This resulted in the engagement, at one time, of 1,000 tanks, 700 of which moved in the direction of the Oboian highway. The remainder attacked in the direction of Korotian.

The German command hoped in this manner to effect a rapid and decisive advance. The German tanks, however, suffered heavy losses and the few tanks which did succeed in breaking into the Russian advanced defenses were destroyed by artillery fire from dug-in Russian tanks in positions further toward the rear.

During the first day, the Germans on the southern front succeeded in penetrating from three to four kilometers into the Russian defense zone. This they were able to do with a loss, according to Russian figures, of around 10,000 men, 200 tanks and 180 planes.

On 7 and 8 July, the Germans engaged fresh reserves in the south, and continued to conduct a furious tank attack on Surtsev, Yakovdlevo and Lutki. The point of their armored wedge was directed toward Yakovdlevo along the highway leading to Oboian. The Germans attempted here, at any cost, to break through the Russian lines in order to win operational freedom for their armored formations.

On 8 and 9 July, the German com-

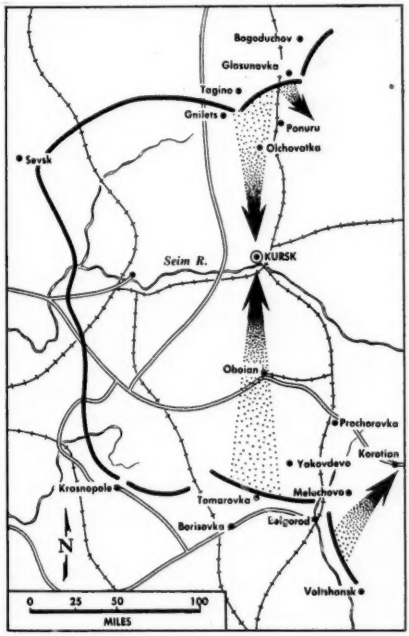
mand assembled a vast quantity of armor north of Yakovdlevo. There the armored corps from the Elite Guard and the XLVIII Armored Corps were engaged in a new attempt to push through to Kursk along the Belgorod-Kursk highway. This last attempt also failed. The Russians made a counterattack on the flank of the advancing German forces and, as a result, the German command was forced to detach large portions of the forces and send them into the attack formation for the protection of its flanks. As a result the attack was weakened, and every day the Germans were obliged to diminish the breadth of their front. On 9 July, the German forces in the Oboian direction, went over to the defensive. Their plan to drive their way through to Kursk, from the south, had failed.

Concurrently with the fighting in the direction of Oboian, a similar furious battle was taking place in the direction of Korotian. Here, the III Armored Corps and the II Army Corps, whose mission it was to protect the upper portion of the flank of the southern main German formation (the Fourth Armored Army), were attacking. Here also the German forces were stopped after a few kilometers of advance.

The Germans, however, did not intend to abandon their attempts to reach Kursk from the south. They merely altered the direction of the main attack, shifting it in the direction of Prochorovka. The Russian defense, here, was crushed by means of two simultaneous drives. The formation which previously had attacked toward Oboian now attacked northeast from west of Prochorovka. At the same time, the III Armored Corps and the II Army Corps attacked north from Melechovo. Violent battles occurred at Prochorovka between German and Russian armored formations and on 11 July, during their attack from the west and south, the Germans succeeded in gaining some ground. But the following day, when the Germans resumed the attack, the Russian command engaged guard forces under the command of General Syadov, together with all available armored forces under Rotmistrov (later Marshal of Armored Forces), in a powerful counterattack.

Armored Battle

This led to a battle between armored forces which, in magnitude, has never been



equalled since that time. More than 1,500 tanks and powerful air forces took part on both sides. The result of the battle was that the Germans were hurled back. The fighting which occurred on that day (12 July) may be considered as the turning point in the German summer offensive on the eastern front in 1943. Subsequently, the initiative passed over to the Red Army. After a few, lesser, local attacks, the Germans went over definitively to the defen-

sive along the entire front on 16 July. The battle of Kursk had ended in a German failure.

Experiences and Lessons

The thing mainly apparent in a study of the German Kursk offensive is the absence of surprise. In 1941, the Russians did not know when the German attack would come. Neither did they know on what fronts the concentrations of forces would occur. Where and when the German offensive would begin in 1942, was likewise no better known. Both of the great Russian winter offensives, particularly that of November 1942, came as a surprise to the Germans. At Kursk, on the contrary, the Russians knew through very good intelligence not only the attack objective of the Germans, but also the time when the attack would begin. Truly, the Germans had effected a great concentration of forces at Kursk, but such concentration is of little advantage if it cannot be assembled secretly. If this is not accomplished, the enemy is able to assemble all his forces in the threatened sector. And this happened, with the result that the German forces were at no time stronger in the sector where the concentration was effected than the Russians. It seems especially notable that the Germans engaged in no deceptive offensive action on a secondary front before launching the main attack. The German envelopment forces attacked Kursk simultaneously from both north and south without any preceding deceptive maneuver.

The experiences of war show that if an attack which has been carefully planned and executed with adequate means is held, or badly slowed down on the first day, a repetition of the attack in the same place and manner is rarely successful. Simple increase of strength in an attack is generally not enough to insure a rapid advance, if the first blow has failed. It is more likely that the reverse suffered by the attacker will have further strengthened the fighting morale of the defender and bolstered his will to resist. When the jaws of the German pincers began to close in on Kursk, the advance achieved during the first twenty-four hour period, in spite of heavy losses, was very modest. But in spite of this, the attack was repeated against the same objective the following day.

Armor and Artillery

Judging from the Russian description of the battle, it appears that the Germans had counted on being able to crush the Russians by means of powerful drives by massed armor supported by artillery on caterpillar mounts for direct fire. Of the thirty-eight divisions which the Germans engaged in the attack, seventeen were armored and three were motorized divisions. The Russian description speaks, therefore, of the attack being executed in two areas which were relatively limited in comparison with the strength of the forces engaged, and that the attack was begun by a charge of hundreds of tanks. The infantry, it seems, played the role of an auxiliary arm only, first for protecting the flanks of the attacking armored formations, and secondly for liquidating the pockets of resistance which the tanks could not crush and were obliged to pass up. The artillery was mainly employed for preparation of the breakthrough of the first Russian defense line. The attack on the southern attack front was initiated by a fire preparation of only ten minutes.

Armored Tactics

Thus, it appears that the Germans at Kursk attempted to employ a modified form of the armored tactics which they so successfully used at the beginning of the war. The day of such tactics, however, had passed. They were not suited for employment against so tenacious and courageous an adversary as the Russians, or against an enemy whose command was neither counselled, nor meant, to need-

lessly sacrifice men and matériel. For breaking through the strong and very deeply organized Russian positions at Kursk, there would probably have been required another method of procedure involving a slow and methodical advance in which each stage was prepared by means of several hours of concentrated artillery fire and in which powerful artillery was at all times ready to check enemy counterattacks, that is, tactics similar to those later employed by the Russians against the Germans.

At the beginning of World War II, a breakthrough, even on a small front, frequently led to the breakdown of the entire defense. The Germans succeeded, at Kursk, in achieving, a few, local, tactical breakthroughs, but these led to no results of great consequence. The Russian formations which were grouped on the sides of the breakthrough points, did not abondon their defense, even when attacked in the flank and rear. The narrow wedges which the Germans in a few places succeeded in driving into the Russian positions became the object of Russian counterattacks on their flanks and were cut off. The Germans did not succeed, consequently, in widening the gaps they made in the Russian defenses for the purpose of giving operational freedom to their armored forces.

Defense in Depth

The experiences of the battle show, according to the book, *The Battle of Kursk*, that the attack of strong forces, in which large quantities of auxiliary technical means such as armor are employed, can be held by defenses organized with great operational depth. At Kursk, some one hundred German tanks per kilometer were employed on the main attack fronts. The Russian defense area in the Kursk salient had, as the one at Stalingrad, a depth of more than one hundred kilometers in certain directions and consisted of defense sectors and strongpoints which, like breakwaters, split up the attacking German forces, troubling and impeding their movement.

Although the Russians had large reserves at their disposal, they did not attempt to institute a very strong defense over the entire length of the Kursk salient, but concentrated their efforts to the areas under attack.

"One of the most important duties of a commanding officer in charge of a modern formation," it is stated, "is to seek accurate knowledge of enemy attack concentrations. When in the possession of such knowledge, a commanding officer is able to foresee where the main attack is to be expected, and on the basis of this knowledge dispose his troops and reserves in the defense area."

Antitank Weapons

At the time of the battle of Kursk, antitank weapons were far more effective than they were at the beginning of the war. They had not yet, however, attained the degree of effectiveness they possessed during the last year of the war. At Kursk, the Russians had placed a large number of pieces of artillery in position with the mission of supporting the infantry troops in their battle against German tanks, from the vantage point of the infantry's defensive positions.

In addition to the direct fire of artillery pieces, functioning individually, indirect artillery fire was very effective against German armor. In the defense of Kursk, the Russian artillery grouped in the northern sector of the salient consumed 1,198 vehicle loads of projectiles of all types and calibers. Sixty-one per cent of the attacking German tanks were destroyed. This was accomplished mainly by artillery fire. From the very beginning, the Russians maintained a powerful artillery reserve, which, after rapid concentration, could be engaged against the front sector from which any major German armored formation had begun an advance.

When the Germans attacked Korotyansk, the Russians were able to meet them with an artillery formation of no less strength than ten regiments.

During the fighting in the Kursk salient, the Russians also made use of tanks which had been dug-in and camouflaged in carefully chosen places in infantry positions. These tanks showed themselves to be of great value as a support for the infantry, particularly when the latter, in an enemy tank attack, were obliged to abandon their combat positions and seek shelter in positions further to the rear.

Aviation

Russian aviation played a decisive role in the defense of the Kursk salient. During the fourth and fifth days, the Russians succeeded in obtaining superiority in the air. As a result, the German air force was not able to support the attacking German ground forces effectively, but was tied up in battles with the Russian fighter aviation. The Russians give the losses of the German air force during the first six days as approximately 1,100 planes. The Russian planes of the Hyoshini-2 type succeeded in putting several German tanks out of action.

The book, *The Battle of Kursk*, emphasizes, lastly, that modern defense must be mobile, and it is necessary to seize every opportunity for a counterattack. It says among other thing that modern defense must be actively conducted. If sufficient forces and defense means are available, the defender may not only make it his mission to stop the enemy who is breaking into his position, but must also seek to prevent him from recovering once his attack has been repelled. Every suitable opportunity for going over to a counterattack must be taken advantage of for the purpose of crushing the adversary.

"The defense command must attentively and continuously follow the progress of the action and seek to detect the critical turning point where the attacking forces are sufficiently disorganized and the momentum of the attack is dissipated, or nearly so. Only then is the time ripe for the execution of a counterattack with the main body of the defense reserve with the aim of cutting to pieces and annihilating the enemy forces that have broken into the position. On the other hand, if a counterattack is executed too late, the enemy is afforded time for organizing the ground for defense in addition to the organization of his fire direction. This renders the liquidation of the enemy forces very difficult.

"Only on the condition that the commanding officer keep his finger on the pulse of the battle for the entire time will he be able to discern the proper moment for the defense forces to go over to a counterattack. This is possible only when there exists a well organized intelligence service with reliable and flexible connections and dependable organization for the direction of action."

In war, the only sure defense is offense, and the efficiency of offense depends on the warlike souls of those conducting it.

General George S. Patton, Jr.

Cyprus as a Training Ground

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel H. E. Crocker in "The Fighting Forces" (Great Britain) June 1947.

THERE have been recent reports that Cyprus is to be made into an important base for British troops when the evacuation of Egypt takes place. From its position, the island commands the exit from the Dardanelles, and would be an important outpost covering an advanced base in the Middle East.

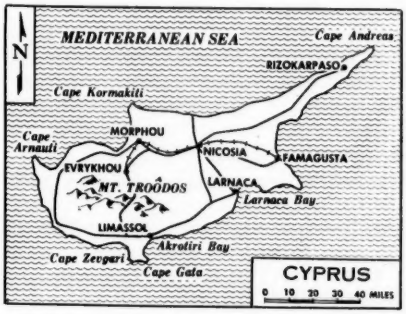
The country itself is admirably suited for combined training. During the summer, when cultivation ceases, troops could move freely across country without inflicting damage to the farms. The wide open plain between the mountain ridges that fringe the northern coastline and Mount Troödos to the southwest would afford ample room for troops, while the mountains themselves are ideal for mountain warfare. Some of the hills, notably those near St. Llarion to the north, would call for a high degree of skill and endurance to scale them.

The capital of the island is Nicosia, from which roads radiate in all directions. During the recent war these roads were put in first-class condition for heavy motor traffic, and very little would be necessary to keep them in good order.

Water supply is an ever-recurring difficulty in Cyprus. The Colonial Office has devoted large sums for the purpose of laying a piped supply from the northern hills to the town of Nicosia, but as late as the autumn of 1945, nothing had been done in the matter and the town was still dependent on wells. Springs in the hills would afford inexhaustible water supply for troops, for which an extensive water system would be established. At the same time, it is possible that, were these springs developed and opened up, they might provide a valuable source of power for electric energy which could be used to work the railways and supply light and power to the camps. During the winter there are heavy rains, which fill the springs and wells in the plains and give ample supply.

The water, however, lies in the fields and renders cross-country work, at any rate for wheeled traffic, almost impossible, but this is the busy time on the farms, and most of the plains would be out of bounds to troops.

The broken and irregular nature of the country would afford excellent opportunities for working over difficult country, but there are very few features of any impor-



tance. The surface is cut up in all directions by nullahs of varying depth which add to the difficulties to be surmounted, but add enormously to the value of the terrain as a training ground. This leads to individual action and the initiative of junior leaders and individual men who are cut off from their own formations and often lost to sight amid hills and depressions of the ground. Thus an eye for country is developed and a sense of direction in attaining one's objective. The ground, too, lends itself to surprise and ambush, and scouting and reconnaissance work would receive thorough training.

The mountains to the north as well as the massif of Mount Troödos would form excellent positions for antiaircraft batteries against attack from the north. The batteries could be concealed among the folds in the hills and camouflaged among the trees.

The supply question for any large body of troops would require special consideration, for, although the island can provide ample crops of all kinds, most of these would be required for local consumption. Most of the food supplies required would, therefore, be imported from other sources. There is very little wood, either for constructional purposes or for firewood, and this, too, would have to be imported. In former days, Cyprus was noted for her timber grown on the mountains, and was, at the same time, celebrated for the skill of her boat-builders, who were famed throughout the Mediterranean. Nowadays, however, owing to increasing needs for cultivation, almost the entire forests that once clothed the country have been destroyed, and the island suffers the resultant shortage of rains. The Colonial Office, from the Development Fund, started an extensive reforestation scheme and over 100,000 young trees were planted and throve well on the mountain slopes. Unfortunately the shepherds discovered that these young trees afforded very good fodder for their goats with no trouble to themselves, and they accordingly turned their flocks and herds into the plantations to feed on the trees. When they were prevented from this lucrative means of providing pasture for their animals, in rage and fury they destroyed the plantations entirely.

The provision of a good harbor where troops and stores could be disembarked would call for serious consideration. There are no such harbors in existence, although Famagusta was a celebrated harbor in the Middle Ages, but it could not accommodate ships of modern tonnage. It is probable, therefore, that a harbor would be constructed where oceangoing ships could lie alongside. There are quays at Limassol and Larnaca, but there is very little accommodation for dealing with bulk stores or large numbers of troops. Railways run into the interior from these three harbors towards Nicosia and they would have to be enlarged for modern use.

The large sandy bays on the south coast would be ideal places for landing operations. Landing craft could be run ashore on the beaches and men, vehicles and stores disembarked without much difficulty. Commandos landing in advance of the main landing would have good scope for the capture and elimination of enemy posts and the covering troops would find good positions for covering the landing of the main body as they came ashore.

The climate of Cyprus is healthy, and although the plains are very hot during the summer months, there is very little sickness. The hills would afford ideal hill stations, where the men's families would reside during the summer and where the men could spend their furloughs. These hill stations would, in addition, form admirable camps for training in hill warfare.

It is only to be expected that the presence of large numbers of troops would be welcomed by the Cypriots for the amount of money that would be spent in the island. At the same time, however, the possible rise in the cost of living must be taken into account and a strict price control and strong action against black marketeers would be essential.

Aerial, Motorized and Mechanized Warfare

Translated and digested by the MILITARY REVIEW from an article by Colonel Vincente Guarner, Military Attache, Spanish Embassy in Mexico, in "Revista del Ejército" (Mexico) June 1947.

WARFARE is an art for generals, a science for officers and an aggregate of specialized trades for troops. If compared with past conflicts, modern warfare was changed, although its fundamental principles remain unaltered—imposition of one's will on the enemy either through defensive or offensive action; retention of freedom of maneuver; and allocation of forces by assigning the maximum effort to the principal objective. By properly applying the principles of combination of effort and concentration of force, which constitute the essence of maneuver, it is possible, to comply with the maxim by Clausewitz to "separate for the march, and concentrate for combat."

Weapons of warfare have evolved through the application of new discoveries in science. Just as the invention of gun powder resulted in changes in the past, the application of modern principles of electronics, guided missiles and atomic energy will change weapons of the future. The period which was marked by the use of large fleets and railroad transportation, with coal as fuel, was followed by an era of motor vehicles and tanks propelled by petroleum fuel.

At present we find ourselves in an age of electronics and atomic energy without fully understanding where it will take us. Thus far it appears certain that the average officer must acquire a knowledge similar to that possessed by the tactician, the ballistic expert and the mechanical engineer. In 1937, the German General, Halder, procured commanders with broad capabilities by having full colonels of the army ground forces indoctrinated with the tactical and strategic principles governing the navy and the air corps. Likewise, the British Marshal, Wavell, requested each air force officer of his general staff to satisfactorily complete the courses of instruction for general officers of the ground forces and serve six months with tank organizations.

Future Concepts of National Defense

Development of long-range guided missiles, jet-propelled supersonic aircraft, submarines with special air intake such as the *schnorkel*, radar, atomic energy and bacteriological laboratory experiments, has led to a new evaluation of the different branches of warfare despite the traditional reluctance of military leaders to change. After World War I the development of fire power, aerial bombardment and armor led nations to fortify their boundaries with structures such as the Maginot, Siegfried and Stalin lines, and Hitler's "Atlantic Wall." Today, however, rocket bombs and airborne troops can easily overcome these fortifications. Consequently, the future defense of nations will probably be committed to the following echelons:

1. One echelon whose gun crews will be responsible for launching guided missiles across frontiers and between continents.

2. Another echelon or bombing wave, operating mainly as pilotless aircraft.

3. Another echelon of airborne troops and fast moving armored forces, responsible for occupying the already destroyed enemy territory, and,

4. Armies and fleets of conventional organizations, supported by ordinary aviation, to achieve total occupation.

War industry will be more diverse since warfare today is a matter of laboratory enterprise. Antiaircraft defenses will also be increased, because the only possible defense against atomic guided missiles and

aviation armed with atomic explosives is the antiaircraft shell with proximity fuze.

But regardless of what is to come, it is impossible at present to place in the air the enormous forces which are normally transported by land or sea. Aviation is still needed for destruction, just as airborne and armored troops are needed to capture the terrain. We still must break through the fighting front, whether it is fortified or not. Airplanes, tanks, machine guns, and warships will continue to be indispensable. For the time being, therefore, aerial and mechanized warfare continues to play its role in this post-World War II period.

Between Wars

In the period following World War I, French army regulations in 1923 indicated the general nature of the armored and motorized combat unit of today. General Debeney, director of the Superior War College in Paris, predicted that the combatant of the future would go to battle armored as in the Middle Ages, except that instead of having a brave heart beating inside his armor plate he would have a motor powered by petroleum.

Colonel Fuller of the British Army was admonished by the general staff for an "excess of imagination" because his book *On Future Warfare*, published in 1923, stated that future wars would be won in the valleys because armored forces could operate in mountainous terrain. He also contended that air support to armored forces had to be continuous, and that armies of the future would include in their equipment machines for reconnaissance, breakthrough, artillery support, transportation, exploitation of success, and pursuit. This prophet was not wrong; the Germans took advantage of his ideas to organize armies based on armored divisions for their carefully planned scheme of world aggression.

Insofar as aerial warfare was concerned in the period following World War I, the air forces were still regarded as a mere auxiliary of the ground forces or the navy. As a result, ground and air forces were organized for adaptation to stabilized warfare, without paying any particular attetion to the fact that the army, the navy and the air force are employed under different conditions according to their capabilities, and without regard to the fact that future war would be quite different from trench warfare.

However, in 1921, the Italian General, Douhet, declared that the air forces could be employed everywhere, and pointed out the need of organizing the Ministry of National Defense into three branches for the land, the sea and the air. He contended that on the latter rested the ultimate decision for success.

Another forerunner, General Mitchell, of the United States Army Air Corps, was suspended from the service for predicting the "air warfare of the future" and affirming that "airplanes could sink warships."

In 1933 came the enormous development of Hitler's aviation, which was tested later in Spain on Franco's side. New German air armies were created, the *Luftflotten*, consisting of 700 planes distributed in two bombing divisions (*Flieger Korps*) with one wing of combat planes (*Geschwade*) and another for reconnaissance missions. Of these, three were employed in Poland, one in Norway and five in France. But the Germans failed to grasp the true strategic concept of air power, limiting themselves mainly to production of dive bombers which were primarily used in support of army ground forces.

In 1940 Hitler conceived his project for the invasion of England. Goering had given his air forces sixty-five days for rest, maintenance, and repair, after suffering a loss of 2,080 planes in France. From 8 August to 30 August, the *Luftwaffe* started its attack on British ports,

cities and airfields. In the meantime, the British consolidated their different air combat commands and antiaircraft defenses under a single command. Up to 5 September, the Germans had lost 1,340 planes, and they lost 311 from 5 September to 14 September. On 15 September, Goering attacked London with two gigantic waves of 250 planes each, losing ninety during the morning and ninety-seven in the afternoon. The invasion of England, depending on German air supremacy, failed in that huge air battle which showed the superiority of British planes over German planes.

Since that time it can be said that a new air strategy has been born, and it is summed up by Major Severski in his book *Victory Through Air Power.*

Foundations of Present Air Warfare

Let us examine the problem of air warfare as it exists today. So far, modern aviation has been divided as follows: (a) Strategic, for the purpose of destroying enemy cities, industries and communications; (b) Tactical, in support of ground or naval forces; and, (c) Defensive, preventing access of the enemy to the coasts and frontiers of the nation.

Although its airplanes became rapidly obsolete, aviation is a low cost weapon. It is a weapon adaptable to the needs of small nations, since for the cost of a single destroyer they can afford several offensive and effective air squadrons.

Airplanes are classified according to their individual characteristics into bombers, fighters, and reconnaissance or observation planes.

Bombers.—These constitute the main branch of the air forces. At present their power is immense. There is, for example, the great superfortress "B-36," which can drop twenty tons of bombs on a target 15,000 kilometers away from its base and is capable of bombing any particular spot in the world.

The principal armament of this type of aviation consists of bombs, which were manufactured initially as large as twelve tons, but later, outside of the atomic types, have been made in twenty-five and fifty ton sizes.

With this deadly weapon, thirty-six main objectives as well as numerous secondary objectives and all communications were attacked in Germany during World War II. Their employment in 1944 reduced German production by about 40 per cent and forced Hitler to employ in the west two *Luftflotten,* 100,000 antiaircraft guns, and three million persons in defense activities and in building up an underground industrial system.

Fighters.—Their characteristics include: (a) great climbing and propulsion speeds; (b) enormous fire power delivered by six or eight machine guns and two or three guns; (c) great maneuverability of the planes; (d) a high ceiling, and (e) limited visibility.

Fighter aviation, which is based on air combat requiring difficult and complicated combat and approach tactics, classified its planes into;

(a) Interceptors which are small sized, fast, single seaters, with very powerful engines.

(b) Fighters (medium and heavy), with a crew of two or three men, powerful engines and long range.

(c) Fighters (fast), with powerful engines, generally two-place, employed in offensive bombing action and in general support or cooperation.

Rocket bombs have provided this type of aviation with great offensive power, especially against ground and armored forces. It is common practice now to arm this particular type of combat aviation with these remarkably deadly projectiles of great penetrating power.

Reconnaissance Aviation.—This is classified into: (a) exploration aviation, which discovers objectives at distant

ranges and uses large bombers with no cargo, but provided with photographic equipment; and (b) reconnaissance and liaison aviation, to discover short range objectives on the battlefield, to maintain liaison between the command and the troops in the adjustment of fire, and to keep maps up to date.

This type of plane will only fight under exceptional circumstances. It collaborates with the large ground and mechanized units generally at an approximate depth of 200 kilometers, and obtains photos of enemy activities and the like at night by use of flares.

Airborne Troops.—The idea of employing these special troops originated in the USSR after World War I, and was developed in maneuvers at Kiev and Minsk in 1934 and 1936 respectively. The Germans copied and improved the idea and at Mukeberg (1937) a full regiment with all its elements was dropped by parachute. The United States, France and Italy followed in organizing this type of combat force.

Antiaircraft Defenses.—Antiaircraft defenses are subdivided into two branches: (a) *Active*, whose mission is to destroy air aggression and which is particularly dependent on a detection net-work which today locates and identifies planes 150 miles away by radar. This active branch consists of interceptor planes, artillery, antiaircraft machine guns, searchlights and balloon barrages, and is provided with the corresponding services of communications, quartermaster, maintenance and repair, transportation, medical and training of personnel; (b) *Passive*, which is intended to counteract the effect of air attacks by dividing the country into zones, in each of which, at all main objectives, the following services are established: general (fire fighting, the picking up of projectiles, alarm, camouflage, traffic, etc.); engineer work (construction of air raid shelters) and sapper equipment for anti-demolition (*policing activities*); publicity, military police, sanitation and anti-gas activities.

Foundations of Mechanized Warfare

The concepts of motorization and mechanization are different. Motorized units employ their vehicles as means of transportation to the vicinity of battle. Mechanized units fight from their vehicles, almost all of which are armored.

Whole armies of armored elements existed during World War II, the initial employment of which is credited to the Germans in Russia. These large units were composed of four armored divisions (13,800 men, 416 tanks and eight armored vehicles per division), and four motorized divisions, each Corps being organized with two armored and two motorized divisions.

Mechanized Organization.—The first German armored division was exceedingly massive and difficult to maneuver. It was composed of a headquarters company, reconnaissance and signal communication battalions, medical corps unit, one tank brigade (two medium and light vehicle regiments and one heavy vehicle regiment, each section with seven tanks), one mechanized infantry regiment, one mechanized artillery regiment and engineer battalions, maintenance and repair battalions, and chemical battalion.

The United States and Great Britain tried to lighten their armored divisions, and initially they separated the six tank battalions, but later they tried to make these units faster and more flexible on the order of the Russian armored brigades. A later organization of the armored division in the United States was three tank battalions (one light); three mechanized infantry battalions; and three mechanized artillery units, all separate organizations.

Motorized Divisions.—These were operated only at the beginning of the war, because in the final stages of the conflict any division could be easily transported

by the motor vehicles available to the command.

Conclusion

What has been explained in general terms in this article gives a general idea of modern motorized, mechanized and air warfare. The effectiveness of an improvised army against such powerful armies is questionable, unless supported by an underground movement. Even with this support, the German might was but slightly affected, and it required the actual invasion by the Allied Armies to drive the Germans out of the occupied territories. Today, Simon Bolivar's center of resistance in South America could have been easily spotted by aviation and destroyed by armored elements. On the other hand, the improvised armament of that time was almost the same as that used by the regular armies, and today modern armament can not be improvised.

In modern warfare there is no distinction between the fighting front and the rear. Destruction, by employment of atomic energy, could be absolute.

If the lack of morality and of national and international ethics persists, wars of the future will be much more deadly and terrible than those of the past.

The Crete Campaign

Digested by the MILITARY REVIEW from an article by Major A. M. Clarke, in the "Canadian Army Journal" June 1947.

THE Battle of Crete, which began on 20 May 1941 and lasted for twelve days, resulted in the withdrawal of the British troops from that island. The story of the battle, however, is one of a gallant defense against overwhelming odds by a small garrison which, with excellent cooperation from the Royal Navy and the valiant efforts of the Royal Air Force, made the enemy pay dearly for his gains.

Crete is a small island in the Mediterranean Sea approximately 100 miles to the south of Greece, and is about 160 miles long and 40 miles wide. It is a mountainous country and the only main road runs along the northern coast; three subsidiary roads across the mountain link the main road with the south coast. There are only two reasonable harbors and both are on the north coast; they are Suda Bay and Heraklion, in order of size.

Military Background

The end of April saw the evacuation of British troops from Greece. The Commander in Chief was then faced with the possibility of having to undertake operations in five theaters at the same time, and, as his rather meager resources had been further depleted in the Greek campaign, the situation was not good. The five theaters referred to are:

1. Crete: Probability of attack.
2. Western Desert: Germans presently checked, but a renewal of effort probable.
3. Iraq: Responsibility for dealing with the revolt.
4. Suez Canal, Egypt and Palestine: German use of air bases in Syria might constitute a serious threat to the defense of this area.
5. Abyssinia: Remnants of Italian forces still had to be cleaned up.

As the Germans occupied Greece, evidence accumulated which changed the status of an attack on Crete from a probability to a certainty. Reports of concentrations of aircraft, airborne troops and vessels made it obvious that an attack by air and sea was being prepared.

In 1940, British troops, consisting of a two-battalion brigade and certain other details, were first sent to Crete for the

purpose of securing Suda Bay as a refuelling base for the navy. This force was about 7,000 strong. There was also a Greek division on the island, but it was withdrawn in November for operations in Greece, leaving only a few battalions of recruits. During the evacuation of Greece in April 1941, a proportion of the British was landed in Crete instead of being taken to Egypt, in order to effect a more rapid evacuation with limited transport by sea.

When the attack on Crete began, there were about 28,600 troops on the island, including the Greek recruits, but many of these were unarmed due to the losses sustained during the evacuation from Greece, and supporting weapons were practically non-existent. In addition, many of the troops had just come through some heavy fighting in Greece, and were in need of rest. Attempts were made to reinforce the defense with tanks, guns and stores, but owing to German air activity, very few ships ever reached Crete.

Defense Layout

The Commander in Chief visited Crete on 30 April 1941 and placed Major General Freyberg in command, with instructions to organize the defense with the troops available, augmented by whatever reinforcements could be spared and brought over from Egypt. All-round defense of definite sectors was indicated, and Major General Freyberg decided upon four sectors and disposed his troops as follows:

1. Heraklion: Two British battalions, three Greek battalions, 300 Australian riflemen, 250 artillerymen armed as infantry.

2. Retimo: HQ 19th Australian Infantry Brigade, four Australian battalions, six Greek battalions.

3. Suda Bay: 16th and 17th Australian (both improvised), 1,200 British riflemen from various units, 106th Regiment, Royal Horse Artillery, armed as infantry, two Greek battalions.

4. Maleme: 4th New Zealand Brigade in area west of Canea, 5th New Zealand Brigade in Maleme area, 10th (improvised) Infantry Brigade of composite battalions formed from various New Zealand personnel and two Greek battalions, one additional Greek battalion.

There were antiaircraft defenses at Suda Bay, Maleme and Heraklion, and two "I" tanks at each airdrome—Maleme, Heraklion and Retimo. In addition, there were a few Italian static defense guns which served as "field guns." Suda Bay, the naval refuelling base, still had its coast defense guns. Due to the lack of roads and road transport, there was little hope for any one area sending reinforcements to another, and accordingly each area was designed to be self-supporting and each area had the same task, i.e., to prevent enemy landings on the airdromes or beaches. General Freyberg, not realizing the mighty force that the Germans were planning to use (nor the losses they were planning to accept) was confident that, with the help of the navy, the island would withstand invasion.

The Battle

The main attack was launched early on 20 May with a heavy bombing of Maleme airdrome. This was closely followed by glider-borne troops and paratroops landing south of Canea and on the peninsula south of Suda Bay. Most of the paratroops were killed or captured, but the glider troops gained considerable headway in attacking Maleme airdrome. The King of Greece narrowly escaped capture when some paratroops landed near his temporary home, but his escape was engineered to the south coast where he was evacuated by a British destroyer.

During the afternoon, approximately 2,000 parachutists were dropped at Heraklion and 1,700 at Retimo. Although most

of these were accounted for, a party of 100 had successfully cut the road between Retimo and Suda Bay, and Retimo garrison was never again in communication with Force Headquarters.

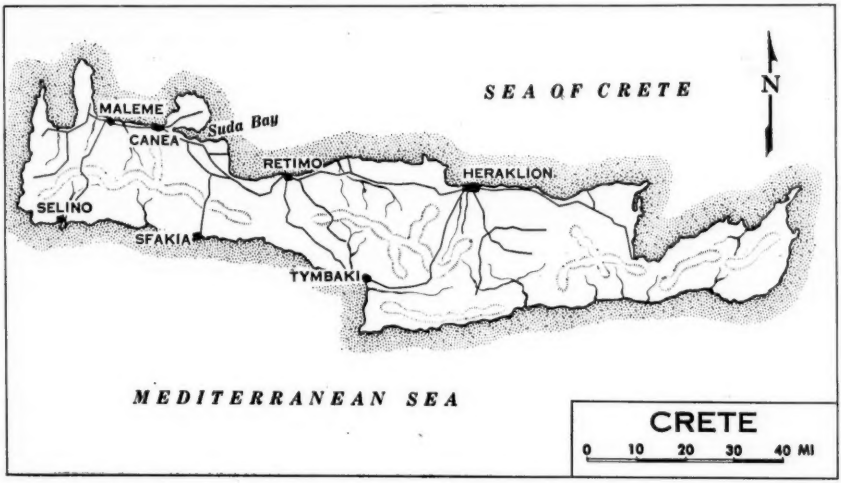
On 21 May fighting continued in the Maleme sector of troop-carrying aircraft landed on and around the airdrome. Losses were heavy, as the airdrome was still under fire from our artillery, but the troops landed were in sufficient numbers to force our line back towards Galatas. Owing to the air cover provided by the Germans, movement of our troops was difficult during the day, so a counterattack in this sector was planned for the night of 21-22 May.

This counterattack was put in early on 22 May and it regained most of the lost ground but, mainly due to intensive dive-bombing when daylight came, our forces were compelled to withdraw towards Canea. During the night, as during the previous night, the Royal Navy sent to the bottom many surface craft carrying German reinforcements, but itself suffered heavy losses from air attacks during daylight.

On 23 and 24 May, heavy fighting continued on the new line, but several attacks on Galatas were repulsed. On the evening of 25 May (the sixth day) the enemy took Galatas, but, in spite of the weariness of the defending troops, New Zealand infantry, supported by British tanks, retook it at the point of the bayonet in a gallant counterattack.

Weary troops, however, with little in the way of supporting arms, could not withstand the pressure indefinitely. Attempts were made to send whatever reinforcements could be spared from other areas, but very few got through owing to the vulnerability of merchant shipping to air attack. Those that did get through were transported on fast warships at night, which naturally limited the type of equipment that could be sent.

On 26 May the line west of Canea was broken and part of Suda Bay fell into enemy hands, rendering this position untenable. The enemy, by this time, had between 30,000 and 35,000 troops on the island, and General Freyberg, on the morning of 27 May, notified the Commander in Chief that the withdrawal from



Crete was inevitable. The Commander in Chief was forced by circumstances to agree and ordered the evacuation of the island.

Withdrawal

The main garrison in the Maleme-Canea-Suda Bay area, less the seriously wounded, withdrew across the mountains to Sfakia beach and were evacuated by ships of the Royal Navy on the nights of 28-29 and 29-30 May. The garrison at Heraklion, which had never been particularly hard-pressed, was evacuated by warships of the night 28-29 May; only those wounded who could not be moved, together with certain medical personnel, were left behind.

The garrison at Retimo, which was out of touch with Force Headquarters, never did receive the order to withdraw, and it fought until 31 May when it was overwhelmed by vastly superior forces. Only a few individuals escaped to the mountains and, subsequently, Egypt.

During the evacuation, as indeed during the whole campaign, the navy sustained heavy losses in ships and it was decided that the night of 31 May-1 June must be the last night for the evacuation of troops. It was found necessary to leave behind a number of troops, some of which had fought so valiantly as the rear guard.

Reports after the evacuation indicated that, out of 27,550 Imperial troops on the island at the start of the attack, some 13,000 were casualties—killed, wounded or prisoners. Against this, enemy losses were between 12,000 and 15,000.

Conclusions

The main causes of the failure to hold Crete were the lack of equipment on our part and an overwhelming superiority in aircraft, combined with its skillful use on the part of the Germans. The lack of equipment in Crete was due to the losses in Greece and to the difficulties caused by the German air force in transporting to Crete what little material could be spared from the scanty supplies at the disposal of General Headquarters, Middle East.

That the defense was not completely a wasted effort, however, is indicated in the report of Lord Wavell, written in September 1941:

"The defense of Crete, though unsuccessful, undoubtedly frustrated the enemy plan for future operations by destroying so large a portion of his airborne troops. The total enemy losses were at least 12,000-15,000, of whom a very high proportion were killed.

"The defense saved, in all probability, Cyprus, Syria, Iraq and perhaps Tobruk.

"That our losses in Crete, though heavy, were very far from being in vain, and the gallant resistance of the force saved our position in the Middle East at a critical time. The fighting in Crete may prove the turning point of the war."

Lessons

There are two main lessons to be learned from this brief campaign:

1. *Air superiority, or at least air parity, is as necessary to the defense as it is to the offense.* Unless the enemy air force is cancelled out, men and material in the battle suffer heavy losses from air attack and reinforcements are slowed up or stopped, until finally the stage is reached where resistance is impossible. The Royal Air Force in the Middle East was very small, and although all available planes assisted to the best of their ability, they were forced to operate at long range from Egypt and were no match for the vastly greater enemy.

2. *Ill-equipped men, no matter how brave, cannot for long withstand the attack of a well-equipped and determined enemy.* Due to the paucity of supplies arriving in the Middle East and the losses in Greece, the defending force started the battle lacking personal weapons, support weapons, transport and other military stores. The Germans, on the other hand, were extremely well-equipped. The

men of the defending force fought gallantly under adverse conditions; they were well led by capable leaders; the cooperation of the Royal Navy, despite very heavy losses, could not have been better. But the shortage of equipment, combined with the enemy's air superiority, was fatal to the defense.

Air Transport Organization

Translated and digested by the MILITARY REVIEW from an article by Major Pretat in "Forces Aériennes Françaises" (France) October 1947.

As early as 1938, Germany possessed paratroop units and was convinced of the practicability of "vertical envelopment." It was the necessity for transporting paratroops which gave birth to the first groups of transport aviation in the *Luftwaffe*. The equipment destined for this purpose was the Ju-52.

The Ju-52 was intended for the transportation of twenty-five infantry troops. The first group destined for transportation of airborne troops was created on 1 April 1938. It was the KGZBV-1 (*Kampfgeschwader zur besonderen Verwandlung, eins*): Special Purpose Bombing Wing, Group 1. It was made up of four squadrons of twelve planes. Four similar groups were soon organized and placed under the command of the 1st Wing. Both wings and paratroop units formed a part of the 7th Air Division.

The 7th Division comprised two wings or nearly 400 planes when it took part in the Polish campaign. The rapid advance of the ground forces rendered useless any operation with paratroops, and the planes intended for their transportation were used for transporting elements of the 22d Infantry Division from Silesia to Lodz and for transporting supplies for the armored points and other advanced ground formations.

Thus, the Polish campaign gave two new missions to the aviation of the 7th Division:

1. Rapid movement of troops to critical points.

2. The rapid transportation of various supplies which were to be laid down on advanced air fields or destined for troops far from the main supply routes.

Under these conditions, as far back as October 1939, the *Luftwaffe* faced the problem of organizing its transport aviation.

It was obliged to chose between two solutions: (a) creation of a transport aviation command with the units to accomplish aerial supply missions, directly under its orders; or (b) placing transport units under the authorities who needed aerial supply urgently. In short, the problem was centralization or decentralization.

The German General Staff decided in favor of centralized organization. It believed it could create with least cost a transport aviation command by associating the *Lufttransportführer* (air transport commander) with the commander of the 7th Air Division. This organization, which provided the 7th Air Division with a double command, was in force during the Norwegian campaign and the beginning of the French campaign.

During the course of the French campaign, on 15 May, the command of the 7th Division, and two of the three wings of which it was composed, returned to Germany for training. Only one transport wing remained on the front. Although the *Lufttransportführer* still had one wing at his disposal, he found himself deprived of the means of exercising

command over it. This led the *Lufttransportführer* to detach the wing groups at his disposal to the 2d and 3d Fleets, then engaged in the campaign of France. These groups were not able to carry gasoline and ammunition supplies at a rate sufficiently high for permitting the *Luftwaffe* to make use of all its means. It appears that the commander of the 7th Division had demanded too much in withdrawing two transport wings from the operations.

It was necessary, therefore, to settle the question as to what was the fundamental mission of the 7th Division: whether it was to operate for the airborne troops or to transport supplies by air. In other words, it was necessary to determine whether the commander of the 7th Division or the air transport commander had priority of decision for employment of the transport units.

In September 1940, exchanges of opinion occurred, but without result. The 7th Division was increased and became XI Corps. But its command remained that of an airborne force and not that of transport aviation. The German General Staff became aware of this at the outset of the Russian campaign, immediately after the battle of Crete, which as an airborne operation, was a brilliant success for the XI Corps.

With the beginning of the Russian campaign, the *Lufttransportführer* was charged with organizing transportation on the front. He worked out the following solution: (a) He assigned to the air forces engaged in Russia no more transport units than were necessary to carry out the "tactical" transportation of their sector; (b) He grouped under a single command the transport units necessary for the "strategic" transportation between Berlin and the zones in which the forces were stationed. Means for signal communication were immediately required to: (1) have information relative to the position of its planes; and (2) to contact its crews for the purpose of possible modification of initial missions in case the military situation suddenly required concentration of transport aircraft.

Also required were ground installations for aid in navigation, and service stations at the principal air fields along the route. At the time this organization was effected, it seems that none of the existing commands of the *Luftwaffe*, not even XI Corps, had such means at his disposal. Therefore, not being able to confide the handling of strategic transportation to a single command, the German General Staff abandoned the solution worked out by the *Lufttransportführer*, and assigned nearly all of the transport groups to the air forces engaged on the Russian front.

A technical advisor was placed with each air fleet commander to assist in getting these scattered transport units into operation. For this reason, the *Lufttransportführer* was assigned to the air formation which operated in the sector where the air supply problems were particularly important. Each formation was obliged to take care of the operation of its own strategic lines in the way that served its interests best.

The absence of an authority with the power to centralize the demands for transportation led to inefficient operation. Rapid deterioration of equipment followed. This, and the slow rate at which the Ju-52s came from German factories, denied all chance of building up reserves of transport aviation. In a crisis, this lack of reserves led to the withdrawal of transport units in quiet sectors and their assignment to formations facing a threatening situation.

Operations at the beginning of 1942 show the *Lufttransportführer* involved in six changes in less than six months time, and having to decide how to employ the transport aviation successfully in each of three different sectors of the Russian front, all of which were either critical or important. A detailed study of the order

of battle of this period shows transport units changing command three or four times.

When one considers the minute preparation required for placing transport aviation in operation, he can see how such a command organization depended on luck. This luck ran out on 20 December 1942, when the *Lufttransportführer*, having 500 planes in the southern sector capable of flying, was able to send to the Sixth Army encircled at Stalingrad only eighty tons daily of the 300 tons which should have been sent, and this because of a bottling-up of 300 planes on a single landing field.

Thus, the first year of the Russian campaign showed the necessity for organizing transport commands in the tactical as well as the strategic echelon. These commands should possess their own means for exercising command and for satisfying the particular needs of their units. Commands of this type were first instituted in the tactical echelon in the Mediterranean region following the Allied landing in French North Africa. In May 1943, there was finally created, in the strategic echelon, the XIV Air Corps, charged with the task of insuring transportation from the interior of the Reich to the theaters of operation in which the German troops were engaged. On 1 July 1944, German transport aviation comprised 1,300 planes, half of them under the direct command of XIV Corps, the remainder distributed to and under the command of the transport aviation commands assigned to the various theaters of operation.

German transport aviation can be summed up as follows:

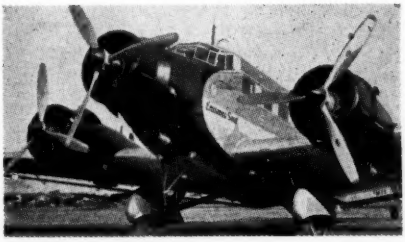
When the first operations revealed the importance of aerial transportation, transport groups were placed under a single command, that of the airborne division.

This command was not practiced in placing transport aviation in operation. It gave satisfaction, nevertheless, in transporting supplies to the forces by air on the occasion of the first engagements of the German Army over relatively short distances.

With the opening of the Russian campaign, the German General Staff realized that special staffs were required to operate transport aviation. Such organizations were instituted in the important echelons of the theaters of operation while a large transport aviation command was responsible for transportation between these theaters and the home area.

Allied Organization

The situation was better for the Allies. In their case, the first transportation to be effected was the convoying of fighter aircraft from North America to Great Britain, a special mission which called for creation of a special command.

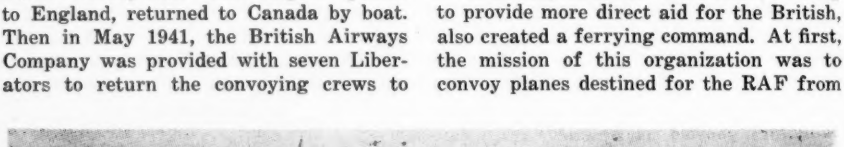


A German Ju 52/3 m.

The line thus opened, connecting Montreal with Prestwick, was more than 5,000 kilometers long and at the outset fixed the scale on which air supply could be anticipated. It also led to a command with the means for effecting transportation over vast distances. Thanks to such an origin it was able in less than two years to extend air routes over the entire globe, and, with airborne troops, to participate in operations wherever the military situation required.

At the beginning of 1940, it required six months for bombers to reach squadrons of the RAF. The English government then decided to speed deliveries by convoying

the planes by air, and the first convoying took place on 10 November 1940. On that day, seven Hudsons took off from Gander and landed at Prestwick. By the close of 1940, twenty-six planes had crossed the ocean in this manner. In March 1941, operation of this service was confided to the Atfero (Atlantic Ferrying Organization) under direct control of the Ministry of Aeronautical Production. At first, the Atfero crews, after delivering the planes to England, returned to Canada by boat. Then in May 1941, the British Airways Company was provided with seven Liberators to return the convoying crews to America. This was the situation when the first North Atlantic Air Service, which operated in both directions throughout the entire year, was inaugurated. In July 1941, the amount of traffic that had to be handled on this line led to an increase in the Atfero, which then passed under military command, becoming the RAF Ferry Command. Over this northern Atlantic line the RAF Ferry Command delivered 722 planes in 1941; 1,163 in 1942; and 1,450 in 1943.



A British Lockheed "Hudson."

This same necessity for convoying planes by air led to the opening of the Accra-Cairo line. The military situation of the British did not allow the slow transportation of fighter aircraft by water around the southern tip of Africa, so the fighter planes were unloaded at Accra. They were set up in less than twelve hours at the Takoradi airdrome and then turned over to the convoyers who, piloted by a *Beaufighter*, followed in a group over the route: Takoradi, Ikeja, Kano, Fort Lamy, El Fasher, Wadi Seidna, Wadi Halfa, Cairo. Between November 1940 and May 1943, 5,300 planes were flown from western Africa to Egypt.

On 29 May 1941, the Americans, seeking to provide more direct aid for the British, also created a ferrying command. At first, the mission of this organization was to convoy planes destined for the RAF from the American factories as far as coastal airfields, and to transport personnel and mail between the United States and Great Britain.

Because of the international situation, the Ferrying Command was obliged, almost immediately, to pass beyond the limits of its first missions. It began to deliver combat aircraft both to the interior of the United States and to the Pacific sector, and to undertake reconnaissance of such places as Christmas Island, New Caledonia and Greenland, "reconnaissance which," said General Arnold, "paved the way for the establishment of the air routes which were to become so necessary to the United States after its entry into the war."

When the Japanese attacked Pearl Harbor, it was seen that boats, slow and exposed to enemy fire, were insufficient for insuring the transportation required by operations. Hence, the Ferrying Command was charged with all kinds of deliveries. Its activities expanded until, by the middle of 1942, it was necessary to plan a complete reorganization.

At first, the American General Staff had thought that this organization should be controlled by the Air Service Command, but in 1942, it perceived that the convoy of planes and transportation missions possessed numerous points in common. Both of these missions required crews which had received identical training, marked air routes, and the means necessary for insuring regularity and safety in air traffic.

Hence, the American General Staff considered it wise to confide the execution of these two types of missions to a single command, the Air Transport Command, which was created on 20 June 1942.

The ATC at that time comprised two divisions: the Ferrying Division and the Air Transportation Division. Wings belonging to these divisions were charged with the operation of the air lines. In June 1942, the ATC possessed relatively limited means of its own, less than 11,000 men, and the facilities of the civil air companies which worked for it on a contract basis. But the ATC rapidly increased, and some of the companies which were working under contract were militarized.

Moreover, the steadily increasing expansion that was soon manifested, led to the raising of the wings to the rank of division, and in May 1945 the ATC, with a total of 2,800 planes, was divided into these divisions:

(1) The North Atlantic Division connecting New York and England and the continent by way of Ireland or the Azores.

(2) The Antilles Division, between Florida and Dutch Guiana.

(3) The South Atlantic Division, crossing Brazil and the Atlantic, to Africa.

(4) The Central African Division connecting Accra with Cairo.

(5) The North African Division whose planes went as far as the Indies.

(6) The European Division.

(7) The Indo-Chinese Division, which continued to carry supplies to China over the Himalayas after the Burma route was cut.

(8) The Pacific Division, extending from the west coast of the United States to Honolulu, Okinawa, the Philippines and Australia.

(9) The Alaska Division.

(10) The Ferrying Division, whose units convoyed all sorts of planes to the various theaters of operation, and whose traffic alone represented thirty per cent of the total activity of the ATC.

Air Transport Command C-47. (USAF photo.)

From July 1942 to August 1945, the ATC delivered 268,905 planes by air, 49,761 of which were delivered outside the United States. Deliveries were effected in 3,981,000 hours of flying, in the course of which 616,348,000 miles were flown, giving an average of fifteen hours of flying and a distance of 2,300 miles covered for each plane delivered. Transportation missions required 5,638,200 hours of flying corresponding to 2,369,400 ton-miles and 6,937,300 passenger-miles.

These results are more astonishing when one considers the average perform-

ance of ATC planes was a speed of 165 miles per hour, only four hours of flying were done each day, and the load carried by the average plane was eight passengers and 2.5 tons of freight.

The number of ATC planes grew from 1,200 in November 1943 to 2,100 in July 1944, and 2,354 in August 1945.

While the ATC operated the strategic lines connecting the United States with its different theaters of operation, in each theater there was transport aviation under special commands called "Troop Carrier Commands." A Troop Carrier Command attached to a Tactical Air Force was charged both with transportation missions within the theater and missions in connection with airborne forces. Thus, inversely to the course pursued by the Germans, the Americans organized the aviation of their airborne forces after the model of the commands of transport aviation. This organization made it possible for a Troop Carrier Command, whose air lines extended over a theater of operations, to effect quickly the large concentrations of planes needed for airborne operations.

In the Salerno landing, to quote from General Arnold, "one hundred thirty-one C-47s dropped 1,900 paratroops, while forty C-47s transported a battalion of infantry and a company of engineers. Exactly twenty-four hours after having accomplished these missions without loss, the transport planes had resumed their ordinary task of carrying supplies for the Fifth Army, and the evacuation of wounded."

The English were to be led, by the course of events, to the establishment of an analogous organization, but it was not until May 1943, that they grouped all their transport units under a single command.

In 1943, the Germans having been driven out of North Africa, the continuity of the British air lines was reestablished. In order to obtain better efficiency, the British government created on 11 May 1943, the Air Transport Command, which assumed command of all transportation units, both those flying over the lines connecting Great Britain with America and the Indies and those which, in the various theaters of operation, transported supplies by air or, when needed, participated in operations with airborne troops.

Thus, by 1943, transport aviation, unknown to the belligerents before their entry into the conflict, had become an important special branch of the air arm.

Four ideas were already taking shape:

1. The extremely special nature of the task of providing air transportation and the principle of economy of load-carrying capacity had necessitated the creation of special commands for the operation of transport aviation.

2. The enormous distance separating the home land from the theaters of operation had given birth to a network of routes connecting them. The use of this network, which permitted strategic movements of great urgency, was entrusted to the high transport aviation command.

3. For tactical requirements, special commands for the operation of transport aviation were also attached to each of the theaters of operation and were assigned the mission of transporting supplies by air in the interior of the theater and, if the need arose, of operating in connection with airborne forces.

4. In order to take full advantage of the speed of transport aviation, it became indispensable that the network connecting the home land with the theaters of operation and the networks within their theaters should be uniform.

This led to the transport commands in the various theaters of operations working in accordance with the norms laid down by the high transport command.

The command of the American ATC comprises a headquarters, divisions and services.

This headquarters is divided into six

sections: A-1, personnel; A-2, information, data; A-3, operations; A-4, equipment and supplies; A-5, plans; A-6, regulations.

A-5 (Plans) has a subsection charged with arranging the agreements with foreign powers for authorization to fly over their territories and intermediate landing rights.

A-6 issues the regulations concerning transportation of passengers, mail and freight; it establishes the rules of priority and, together with the American and foreign civil air organizations, determines the costs at which transportation is to be provided on the military lines.

The divisions to which the wings belong no longer number more than three: the Pacific Division, the Atlantic Division and the European-African Division.

The mission of the services is to mark the air routes of the ATC and to place along these routes the means required by the command for regular and safe operation of the lines.

The services are five in number: 1. The Aerial Signal Communications Service; 2. The Meteorological Service; 3. The Life Saving Service; 4. The Aerial Map Service; and 5. The Flight Service.

The services of the Air Transport Command are able to prepare without delay the air routes over which the American Army could, in a minimum of time, transport its forces to whatever point of the globe the international situation might require. One can see, therefore, that the problems faced by it are infinitely greater than those which have to be solved by the corresponding services of the Civil Aeronautics Administration whose interests are bounded by the frontiers of the United States.

This leads to our conclusion: If an air force expects the greatest efficiency from its transport aviation, it must, itself possess services analogous to those of the American ATC. These services must be placed directly under the command of the transport aviation, if this command is to be made responsible for the operation, safety and regularity of its traffic.

Present war potentials will not permit a lag in undertaking offensive or defensive operations; consequently, a strategic air transport organization must be ready to function instantly, not only in establishing offensive spearheads in forward zones, but also in furnishing support and reinforcement in personnel and supplies to combat areas. Since air is the most flexible and fastest medium of transport, it must be depended upon to meet unknown situations that will face the United States on M-day.

Major General Robert M. Webster

Technical Education of Officers

Translated and digested by the MILITARY REVIEW from an article in "Bellona" (Polish magazine published in London) No. 3, 1947.

TECHNIQUE and tactics are two factors which influence each other greatly and create the modern conception of warfare.

The problem of teamwork in technology and tactics is often mentioned. There is danger that by not having mutual cooperation from the beginning, the efforts of technicians might proceed in a direction contrary to the requirements of the tacticians. On the other hand, tacticians without an understanding of matériel will not be able to use it fully. Thus, a mutual lack of confidence may result, which is only one step from low morale and defeatism.

Technology has now penetrated all parts of the armed forces and has mechanized not only the means of battle but also the entire life of the soldier. Thus it seems that the character of the fighting soldier gradually changes. The soldier becomes more of a mechanic and the fighting is done with the machine he operates. This does not lessen the demands on his personal values. On the contrary, he must have a very high morale independent of his knowledge to operate a complicated machine, because he is often left alone with his machine in battle and without direct control by his superior. The role of the leader also changes, especially in the higher ranks. He becomes an engineer directing machine units, only his "factory" is constantly moving and "produces" a manifold quantity and quality of deadly shots. Therefore it can be seen that the role of the leader is quite complicated. He must be a kind of versatile engineer, directing a few or many machine units of different quality. For example, in one division there exists such a large number of technical means and matériel that it hardly can be expected that the human mind would be able to grasp all its technical aspects in detail. Therefore it has become necessary to call engineering officers, specialists in every field, into the higher ranks. Besides, there also exists a justified principle that in order to direct groups of different machines it is not necessary to know them all in detail. It is sufficient to know about their technical and tactical capacity. Nevertheless, this topic calls for consideration. We must bring up-to-date our point of view concerning the conditions which a modern leader may encounter. We have to answer the question: "To what extent must every officer be a technician?"

A similar question will arise when we talk about the technicians working on military equipment. How large a scope of tactical knowledge should these technicians have? In connection with the technical development of the armed forces, a further question arises. Will it be necessary to create a new type of versatile technician or army engineer in the technical fields serving the armed forces?

The purpose of this article is to consider only the problem of training technical officers.

To direct the machines of war in battle one must know their capabilities. The capabilities of machines are an established fact in a certain respect. Their efficiency cannot be increased by emotional influence, by inflaming battle spirit, or by inciting a hatred toward the enemy. The human being becomes a part of his machine. And even though he does not completely lose his identity, his capabilities are quite limited and dependent on the machine. On the other hand one cannot expect the machine to surpass its normal efficiency. The effect of the machine is strictly limited; it can be expressed in figures and calculated in planning. This leads to planning movements and actions before and during battle. It also makes possible the adapta-

tion and predetermined arrangement of lines in every phase of battle. This makes possible a relatively precise plan of action. To a certain degree, this simplifies the tactics of the lower ranks.

On the modern battlefield, the demands made of a young officer are diminished as regards tactical knowledge, but increased as regards technical knowledge. It is necessary that every younger officer should know the construction of a machine even better than his subordinate who operates the machine. The superior officer need not know the machine better than an officer or technical sergeant of a crew, because the latter are trained exclusively for operation of the special machine. However, the superior officer should know how to direct the machine perfectly. The most important point is that he should know precisely the possibilities of the machine and understand it.

As to the higher ranks, the question becomes complicated, because the human mind cannot grasp all the technical fields which are serving the armed forces in the larger units or formations. It would be necessary to give to the leader general technical knowledge. This means that the officer should have detailed knowledge of the technical possibilities and the practical use of matériel, besides knowledge of its construction principles. His knowledge concerning the functional use of various machine parts also must be very broad. He must have not only technical knowledge in the field of technique and tactics but also personal experience and practical knowledge.

The system of leadership in the higher ranks has experienced considerable change. Transformation of the battlefield through mechanization of the armed forces has also influenced leadership. The main work of leadership has moved toward the planning of battle before it starts. When the battle starts, the execution of any changes in a preconceived plan becomes impossible. The role of the leader during the battle is limited to seeing that everything develops and progresses according to plan. During the primary planning for battle a tiresome calculation of all elements must be done on technique and tactics. Then again comes the tiresome work of elaborating the primary planning into a clear and realistic plan of action. The role of the leader establishing the primary plan becomes somewhat different than in previous wars. The technical possibilities of the modern means of battle limit his freedom in the choice of conceptions. The calculations of his staff officers will present him one or two conceptions, with possible variations, but these depend only upon the enemy. The leader cannot count exclusively on his intuitions, but has to consider the conceptions presented to him which are the result of precise mathematical calculations. Only in those cases, where the members of the staff disagree, does he have to act in the role of the "umpire." The role of the "affirmer" of the work of the staff, and the role as "umpire" call for a man with deep, universal knowledge, a highly developed organizational sense, tact, and a capacity for applying the work of high class specialists. This type of leadership was shown especially in World War II in the Air Forces. We must stress that the type of leader in the higher ranks differs considerably today from the known types of the past.

Next there is the problem of training leaders. For the young officer being educated in an officers school, it seems necessary to change schedules and study programs. At least 50 per cent of the time should be dedicated to technical schooling, with the main factor being practical work in plants and workshops. A candidate for leadership, directing mechanized battalions, should see the production of those machines. He must also know how to make small parts. But the officer school can only give technical knowledge in one field or some related special fields. In

other technical fields it can give only basic information. This is entirely insufficient for an officer of higher rank such as battalion commander, because additional arms from different fields of technique in battle are combined, different from the basic arms of one unit. It calls for the steady, progressive education of officers. It must influence especially the program and curriculum of courses for the battalion leader. Courses for battalion leaders should last about one year with at least 50 per cent of the time dedicated to technical training.

Next there is higher education, preparing staff officers and officers of highest rank. This is a question which demands revision of present ideas, and calls for further discussion and study. However, education of this type should be perfected by giving the students technical information, embracing, if possible, the entire field of technical science. In view of the broadness of the question and limited time, this would be done by use of selected abstracts.

These studies should give the leader a general technical knowledge enabling him to take part in professional discussions with specialists of all fields applicable to the armed forces.

To command a force, courage does not suffice. Ability, talent, sound judgment, intuition and a cool head are also required.

Turpin de Crissé in "*Revista del Ejército, Marina y Aeronáutica*" (Venezuela)

On the whole, the advantage the leader believes he has by continually interfering personally is in most cases only an apparent advantage. In doing so he peforms duties with which others are charged, foregoes more or less their help and increases his own work in such a measure that he finally will be unable to perform all of it.

Moltke's War Lessons

Technical Developments and the RAF

Digested by the MILITARY REVIEW from an article by Group Captain W. E. Oulton in "The Royal Air Force Quarterly" (Great Britain) March 1947.

The Nature of Air Power

IN the two great wars of this century, weapons of all kinds have increased greatly both in range and destructive power. Even so, the gun was still limited to a range of something less than twenty miles. The most effective and distinctive weapons were those which were carried in an aircraft to the vicinity of the selected target, and there delivered with the assistance of the force of gravity. The main difficulty in the successful use of such weapons has been not the problem of launching from the correct position, but the difficulties inherent in transporting the weapon to a suitable point for launching. This has entailed a preliminary battle to go past the defense and, therefore, the preliminary creation of strong air forces. As a result, many people erroneously regard the airplane itself as the prime weapon. This is not so, for it is the bomb, rocket or bullet which is the real weapon; the airplane is merely a means of transport and a suitably located launching platform.

During the critical phases of the late war, air power played a decisive role. In order to win the victory, we and our allies had to create vast fleets of aircraft of various types, to provide crews for them and to use them against the enemy in the air and on the ground. Through the operation of these air forces we were able to cut down the enemy's ability to continue the fight and materially to incapacitate the opposition to our ground forces engaged in the reoccupation of Europe and the Far East.

The mere possession of large numbers of aircraft and brave, well-trained aircrew, the stately maneuverings of vast air fleets, meant nothing in itself. Air power was simply the ability to deliver a sufficient number of adequately destructive missiles at selected points and selected times. Air superiority meant that we delivered—or threatened to deliver—more and better missiles, more accurately, than could the enemy; and that, in the end, the enemy was unable to impede us in the air transport of missiles to suitable delivery points in whatever quantity, quality, time and place might be required by our commanders in the field. Airplanes in themselves were valuable only as transports. For both offensive and defensive purposes, their value will remain only for so long as they continue to be the most accurate, effective and economic means of delivering bomb or bullet to the required target.

We ended the late war with a well-balanced air force. We had a large heavy bomber force for the delivery of the heaviest and most destructive missiles to strategic targets. Our tactical air force had achieved very great skill and effectiveness in operating with our ground forces against the enemy in the field. Weapons carried in aircraft complemented those operating on the ground. Our defensive fighters were able to deny to the enemy any satisfactory opportunity to deliver his missiles on to targets of his choosing. Transport squadrons moved men instead of missiles, and conferred undreamed of mobility on our armies.

In 1945 two major events occurred in the history of warfare. They did not come early enough to enforce any drastic changes in the form of air power in the war just ending. They will, however, compel us to reshape entirely our ideas on warfare for the next three or four decades. The first event was the successful introduction by the Germans of the elementary long-range rocket known as the V-2. The second event was the successful production and use of the atomic bomb.

It was immediately apparent that a combination of these two new instruments of war would make it possible for a missile, many hundreds of times more devastating than anything previously contemplated, to be delivered to its required destination without any need for air transport for the greater part of its journey. It seemed possible that a small group of technicians, operating in a secure base within their home country, would be able to achieve more effective results in a few minutes than could a large strategic heavy bomber force in months of costly air attack. At this point in the history of weapon development the late war ended.

Future Air Striking Power and Bomber Command

The Armed Forces were rapidly reduced to near-impotence by the process of demobilization, and we are now faced with the task of recreating, from inadequate resources, a nucleus of military strength capable of making an effective contribution to world peace. The problem which now faces the RAF is how best to reshape the pattern of our force in view of the advent of the long-range rocket, the atomic bomb and the strictly limited manpower available to us. The force to be created must provide a powerful striking force as a deterrent to aggression, and an effective defense to withstand an unprovoked attack.

For the next five or ten years, finance and manpower are certain to place overriding limitations on our military policies. The development of long-range rockets and atomic war-heads is sure to be a slow and expensive process, and there can be no immediate change in the general pattern of the Royal Air Force—unless another war intervenes. With engine and airframe developments, speeds and ranges will continue to increase and will compel modifications in the tactics employed in the late war; but there will be no sweeping changes in the form of air power. We shall of necessity continue to use heavy bombers for strategic offensive bombing; medium, light and fighter bombers for army support; day interceptors and night fighters for defense, and specialized aircraft for maritime operations. But these forces will entail simply improvements and developments of existing equipment. No radically new ideas are involved.

Although, for the time being, we can do no more than keep in existence a small but highly efficient nucleus of an "orthodox" air force of the current pattern, we must immediately start to plan the requirements and air staff policy for the RAF of 1960. In that future force, the long-range rocket is almost certain to become our primary striking weapon. If we are wise, we shall cling to the ideal of requiring only to produce the right missile at the right point and not let our resources be dispersed on projects which, though useful in the role of commercial transport, are not relevant to the development of the most effective and economical striking force.

There are, however, many sceptics who regard the V-2 as an advanced development rather than as an elementary model, and who claim that it will never compete with the heavy bomber either in range or in accuracy. It may, therefore, be appropriate to review recent rocket development in order to get some idea of what may be achieved in the near future. In the past, there have been two main schools of thought interested in rockets. The more popular group were interested chiefly in the use of power rockets as a form of tactical artillery. Modern rocket weapons of this sort have achieved phenomenal successes, but they remain nothing more than tactical artillery.

A much lesser-known succession of pure scientists—not military engineers—have been working for the past two centuries on the possibility of space travel and the problems of reaction propulsion connected

therewith. It was the fruits of the work of these men which was seized by the Nazis and—within ten years—resulted in the V-2.

In 1929, the German Rocket Society was founded to advance these studies by practical experiment and, as early as 1930, encouraging results were obtained from rocket-motors fueled with liquid oxygen and gasoline. The Society had, by 1931, produced very elementary rockets, or repulsors, as they were called, which reached a height of over 3,000 feet. Mechanical and metallurgical problems, the chief difficulties, were being tackled with some success, when in 1934 the Gestapo impounded all equipment and records. Some of the more energetic members of the Rocket Society eventually reached America safely.

Ten years later, as we know, the elementary repulsor, weighing a few pounds and ascending to 3,000 feet, had grown to a forty ton weapon ascending to one hundred times that altitude, and with ranges of over 100 miles. Little more than half this progress in the next ten years would produce rockets capable of ascending to a height of nearly 500 miles, at which height they could circle the earth without any further fuel expenditure as planets, until redirected earthwards. Pre-war calculations, borne out by V-2 results, show that a rocket weighing only 140 tons, with a two-ton warhead, could be dispatched to an altitude where it would encircle the earth once every 100 minutes until directed down to its target.

There seems no reasonable doubt that, within ten or fifteen years, long-range rockets could be produced to be launched from the United Kingdom to fall on any spot on earth, within the accuracy of the weapon. As to that accuracy, past experience leads us to believe that it would be adequate for war-heads of the lethal radius of the atomic bomb or a biological bomb, even without remote control. With remote control, at the risk of radio counter-measures, the accuracy of such a rocket should approximate the present strategic bomber.

If the foregoing argument is accepted, there can be no doubt that our strategic striking power of 1960 should be based on the long-range rocket; and the concept of the heavy strategic bomber, with its insatiable demands on our ever-inadequate manpower, should be abandoned as soon as possible. We should plan now for the creation of a rocket force as the strategic offensive arm of the RAF. Such a force could be based mainly in the United Kingdom, with only enough dispersal to insure security. This arm would replace the present heavy component of Bomber Command, but without involving any change in the Command set-up. The type of warhead to be used in the strategic force rockets may well be limited by international agreement; but as in the case of poison gas, we must prepare for all contingencies until such time as nations show themselves able to live in harmony with their neighbors. For the foreseeable future, it remains the duty of the RAF to continue development of the most effective types of warhead for use in long-range rockets.

There may well arise considerable controversy on the question of which Service shall operate long-range rockets. No ruling has yet been given, but the RAF was created primarily because of the need for a force which could operate in a strategic role, and it would, therefore, be very reasonable to allocate responsibility for long-range rocket bombing—the successor to strategic bombing by aircraft—to the Royal Air Force. No one Service has a monopoly of machine guns or cannon, and no doubt each Service will require the use of heavy rockets in a tactical role. But where the intended operation is of a strategic rather than of a tactical significance, the responsibility should lie with the RAF.

Tactical Air Forces

All recent campaigns show the necessity

for air intervention in the land battle. For close support of land forces, it is doubtful if long-range rockets will ever replace airplanes and the tactical air force should, therefore, continue in something like its present form for as long as the retention of a field army remains our national policy.

As long as the United Kingdom continues in control of colonial and mandated territories, the RAF will probably continue to carry the responsibility for policing and peaceful control of unsettled regions. In Germany also, control by air power—for the period of the occupation—will probably be the most satisfactory means of discharging our responsibility for peace in Europe. For both of these tasks an impressive force is required which, by mere continued demonstration of its presence, will sufficiently discourage rebellious sentiments and render resort to destruction unnecessary. If it does come to interdiction of towns or villages, then action by piloted aircraft would be more humane and discriminatory than assault by guided missiles. For all forms of police duty, a force on the same pattern as the tactical air force is likely to be most satisfactory.

Therefore, for army support and police duties we shall be required to continue the tactical air force in its present form. It is, however, interesting to note that the modern jet fighter looks like being too fast for use in a fighter-bomber role, and we may well require fighters of limited top speed and greater maneuverability for employment with tactical and police air forces.

Maritime Air Forces

Despite all developments in aviation, there seems little likelihood that the United Kingdom will ever cease to depend on surface sea transport for the import of food and raw materials. In time of world unrest, our economic lifelines will continue to be the sea lanes, and our shipping will almost certainly be once again menaced by air and submarine attack. It is almost certain that no enemy would ever deem it profitable to attack small merchant convoys with long-range atomic weapons and any future threat will again come from aircraft and submarines.

Technically, in maritime operations the attack is ahead of the defense, and immense efforts will be needed to counter very fast submarines operating with *Schnörkel* or some form of continuous air restoration. Similarly, the range of shore-based fighters has increased so much as to be a hazard to maritime aircraft operating in any section of any ocean.

Modern war is so very costly that any future aggressor is likely to try to knock us out in the first week or two, and is, therefore, unlikely to dissipate his efforts by attacking long-term targets such as shipping. Therefore, our maritime air force must not be too high a proportion of our total air strength. All we need is an insurance premium. But such maritime force as we do have must be technically first-class. The greatest energy is needed in discovering adequate airborne search equipment for fast submerged craft and in providing a much greater scale of defensive armament. Our Maritime Command, by reason of its unchanging duties, will continue in much the same form as heretofore. But great improvements are required in equipment and technique.

Transport Command

Transport Command must continue as an integral part of the RAF, but recent technical developments are unlikely to have any marked effect on its function or organization. Provided that we have adequate numbers of the most up-to-date air transport, both for close support work and for routine movement of personnel and stores, there is likely to be little change in the next ten or fifteen years.

Organization of Air Defense

The best defense against aggressors is,

of course, a vigorous counter-offensive, but whatever may be achieved in this manner, our defense must be able to minimize the effects of the enemy's initial onslaught. In view of the extremely high speed of a long-range rocket, it will be quite impossible to make any effective interception by piloted aircraft, and our only hope will lie in some form of counter-guided missile which will "home" on the rocket and destroy it or partially neutralize it before the target is reached.

Our main defensive weapon against future long-range assault must, therefore, be a small guided or self-homing rocket missile, of very high speed and initial acceleration, and capable of neutralizing in some way the warheads of approaching long-range rockets. At some future date, Fighter Command should replace the majority of its fighter squadrons with counter-rocket units. Even more than during the past war, this defensive force must be supported by a very wide and highly developed radar organization for reporting, tracking and control of intercepting counter-rockets.

The minor threat from piloted aircraft operating in a tactical role at supersonic speeds will still exist. To counter this threat, we shall have to retain for some time a small force of day interceptor and night fighter squadrons. Such orthodox fighter squadrons should not, however, represent more than about a third of the strength of Fighter Command, and it may ultimately cease to exist as a defensive requirement. After all, a counter-guided missile capable of intercepting a heavy rocket should equally well neutralize an aircraft even when travelling at supersonic speeds.

A function which tied up many fighter squadrons during the late war—the escort of heavy bomber forces—will automatically cease to exist when all strategic bombing is done by long-range rockets. Fighter aircraft of the future will be limited to the defense of isolated strategic and tactical targets and to participation in tactical air forces.

Conclusions

The essence of the application of air power is the delivery of a suitable missile to the chosen target at the appointed time. During the late war, the most effective way of doing this has been to carry a bomb in an airplane to the vicinity of the target, there releasing the bomb. This method involved enormous overheads in manpower and wastage of material and human life.

Science has now made it possible for a far more devastating missile to propel itself from a secure launching base to remote targets, and it is possible to remove all terrestrial limits to the range. We must take every advantage of this much nearer approach to the ideal weapon.

The logical inference from the foregoing is that our main striking force of the future must be built round the new weapon; the corollary is that our defense must be concerned primarily with neutralization of the atomic or other long-range rocket. Those elements of air power concerned with attack on small tactical targets, with intervention in a land battle and with transportation remain comparatively unaffected.

The following recommendations are, therefore, put forward for the reorganization of the RAF:

(a) Bomber Command should be reconstituted as a long-range rocket force.

(b) Fighter Command should be reconstituted as a counter-rocket defense force, backed by a large radar and radio countermeasure organization. A small force of day and night fighters should be retained until further scientific developments render it obsolete.

(c) We should aim to complete this reconstitution of bomber and fighter by 1960.

(d) The tactical air force should be

developed along its present lines, including medium, light and fighter bombers and night fighters. It should be trained in both army support and in air control of the colonial empire.

(e) Maritime air forces should be retained but with radically improved search equipment and much more effective offensive and defensive armament.

(f) Transport Command should continue as at present constituted, but with up-to-date aircraft.

Tunisian Campaign

Digested by the MILITARY REVIEW from an article by Major E. W. Sheppard in "The Tank" (Great Britain) May 1947.

GENERAL Anderson's dispatch, covering the operations of the British First Army from the first Allied landings in French Morocco and Algeria early in November 1942, to the surrender of all the Axis forces in northwest Africa in mid-May, 1943, includes many points of interest.

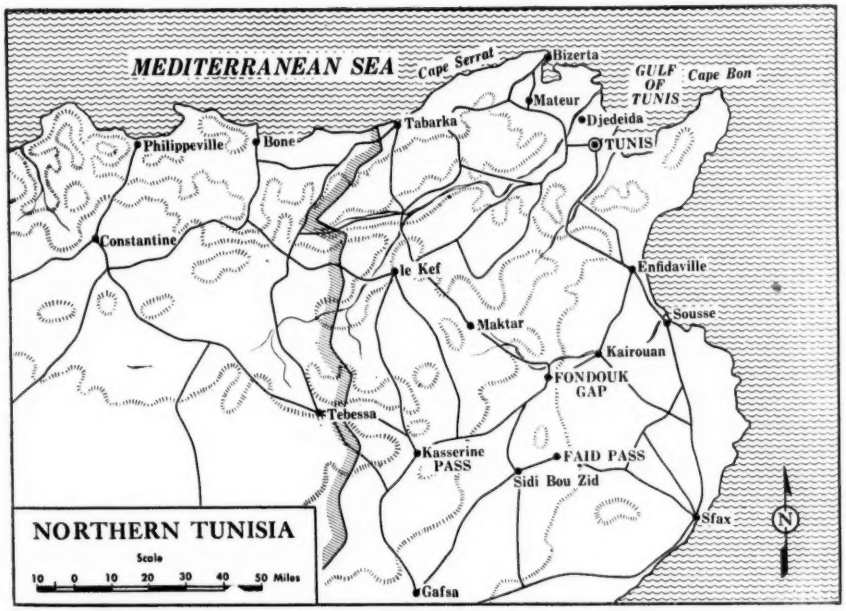
The original landings were made entirely by American troops, except at Algiers, in which the British 11th Infantry Brigade Group and two Commando units fought under the U.S. 34th Division; but once a firm footing had been established ashore, the British First Army was given the task of occupying eastern Algeria and Tunisia before the enemy could seize these territories. General Anderson was from the first of the opinion that this would only be possible if the French forces in Tunisia put up a stout resistance to any Axis entry, and this they failed, or were unable, to do, so that our 78th Division had to enter on its race for Tunis and Bizerte under a grave handicap. Only lightly equipped forces operating at the end of long and precarious lines of communication and on a reduced scale of transport were available for the operation. There was friction resulting from the presence of bodies of American and French troops, both under their own independent commanders, intermingled all along the long front; the loyalties of the French officers and men were, moreover, sharply divided, and their attitude often hesitant and dubious, while the armament and equipment of the French units was defective and out of date.

Throughout the earlier part of the campaign, moreover, our air support was inevitably deficient. This was, in General Anderson's own words, "an exasperating period in which I saw chance after chance disappear for lack of sufficient strength to seize them, and when reinforcements did arrive the enemy in turn had also increased his strength."

At first the 78th Division's advance went well, and by 27 November had attained Djedeida, the nearest point to Tunis that was reached until the final stage of the campaign. But hostile resistance then stiffened and our administrative situation became so precarious that it was clear that our further offensive would have to be postponed to give us time to build up resources and rest and refit our troops. Bad weather then caused further delay, during which the enemy's positions were so greatly strengthened as to render the chances of decisive success clearly hopeless. On Christmas Eve General Anderson therefore decided to abandon any major attack on Tunisia until after the end of the rainy season, "a sad decision, but inevitable owing to the weather." It was clear that the attack, when renewed would have to be on a much heavier scale against greatly increased opposition; meanwhile, the First Army was ordered to contain the enemy by constant pressure, while making limited

attacks to secure a jumping off ground for a subsequent general offensive to be launched when weather conditions should permit.

The ensuing period from January to March 1943, was, however, marked rather by Axis than by Allied offensive activity. The defeat of the French at Faid Pass at the end of January was followed by that of the French and Americans at Sidi Bou Zid in mid-February and the Americans at the Kasserine Pass a few days later. This last setback placed the Allied forces in a difficult position, from which only the rapid dispatch and opportune arrival of part of the First Army's general reserve rescued them. Renewed hostile attacks in the northern sector at the end of February continued for the greater part of March and also led to local setbacks. "It was not a happy period; things went wrong too often and we lost some most important ground." General Anderson ordered V Corps to recover this: first the 46th Division and then the 78th Division, in "as tough and prolonged a bit of fighting as has ever been undertaken by the British soldiers," thrust the enemy out of the bulk of his recent gains. Our front was thus reestablished in positions suitable for the further general advance which was now in course of active preparation.



This final offensive of the campaign was due to begin on 22 April in conjunction with the U.S. XI Corps and the British Eighth Army, now in line on the First Army's left and right respectively. The enemy's resistance was still formidable and he held strong advanced positions, which had to be stormed and his strength worn down before a breakthrough and decisive victory could be achieved.

The week 22-30 April, therefore, saw fierce and sustained fighting all along the

front, and though considerable gains of ground were made and heavy casualties caused to the enemy, he could not be evicted from his main positions without further offensive operations. General Alexander, now in charge of all the Allied armies in Tunisia, decided to transfer from the Eighth to the First Army the 7th Armored and 4th Indian Divisions and the 201st Guards Brigade. This transfer was completed by 5 April by "a colossal traffic movement which was successfully concealed from the enemy by erecting a large dummy concentration of tanks and transport, which led him to suppose that we had split our armor and lulled his apprehension of immediate attack." In General Anderson's view this shows the sense with which air reconnaissance could be deceived. He recalls that, despite most active air reconnaissance, he had himself usually failed to find any warning signs of German attacks in the earlier stages of the campaign.

In the final phase our armored battering ram massed on a very narrow front, went through at full speed to shatter the hostile defenses and leave little but mopping up to be accomplished. "The scenes during the last three days were amazing. The rout of the German Army was complete; prisoners swamped their captors and drove in their own transport looking for the cages. Thousands surrendered without attempting to resist further, while others fired their remaining stocks of ammunition at any target before giving up." The total of prisoners eventually reached over a quarter of a million, of whom one-half were German; the booty was immense. "It was an amazing finish to a fascinating and unique campaign, which highly tested the qualities of the British soldier and proved him to be as tough, resolute and good-humored as ever before in our long history."

The First Army's casualties in the operations were 25,610 (4,443 killed, 12,625 wounded and 6,542 missing). Of these, 13,240 were incurred in the final phase from 1 April to 13 May. The principal British formations and units which took part in the campaign were the 1st, 4th, 46th and 78th Infantry Divisions, the 4th Indian Division, the 1st, 6th and 7th Armored Divisions, the 201st Guards Brigade, the 21st and 25th Tank Brigades, the 1st and 2d Army Group Royal Artillery and the 1st King's Dragoon Guards. Allied formations were the U.S. 1st, 9th and 34th Infantry Divisions, the U.S. 1st Armored Division and the three divisions of the French XIX Corps.

The battle fills but a moment, of course the most important one, but the movements leading to battle, marching, fills the entire life of an army in campaign.

Moltke's War Lessons

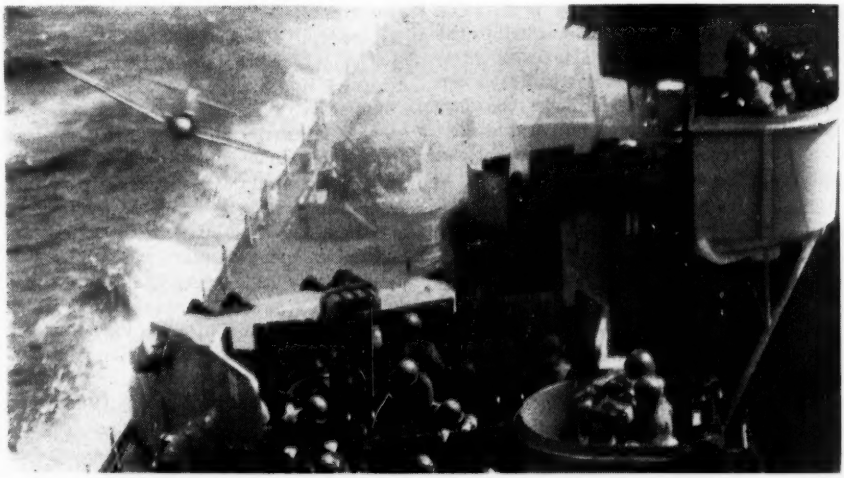
Kamikaze

Translated and digested by the MILITARY REVIEW from an article by Commander Vulliez in "Forces Aériennes Françaises" (France) September 1947.

AFTER the bitter Saipan defeat, in which the 1st Japanese fleet had lost three of its airplane carriers and nearly 400 planes, the conviction grew among Japanese naval aviators that only tactics of exceptional audacity could compensate for the steadily growing superiority of American aviation.

Each pilot knew that the Japanese fleet would not hesitate to sacrifice itself in the defense of the Philippines, which were necessary to continue the struggle. Therefore, they decided to participate in this sacrifice by organizing and promoting suicide attacks. The aviators of the 1st Fleet called their efforts by a historical name. They called it *kamikaze*, which signifies "divine wind." In October 1944, the 1st Japanese Fleet, almost devoid of air protection, was in a bad way. Only a miraculous *kamikaze* could save it.

Suicide attack, in itself, did not constitute a new idea. Many times planes in trouble tried to crash on the deck of an enemy vessel, but these were only isolated cases and acts of desperation. There was also in operation in Japan a school for training "special attack units," which trained torpedo or one-man submarine pilots and, more recently, *baka* pilots (for towed flying bombs), all destined to perish with their weapons. But up to that time, no normal air unit had chosen tactics of attack which would result in the loss of the plane and the death of the pilot. A decision of such grave consequences could not be made by the air force authorities, who



Japanese "Zero" pilot attempting suicide attack on U.S. warship in the Pacific early in 1945. (U.S. Navy photo.)

were obliged to refer the matter to the Imperial General Headquarters.

In support of this idea, Admiral Arima, commander of the 26th Air Wing, crashed on 15 October on an American carrier. This was the spark which kindled the enthusiasm. By 19 October, Admiral Onishi, Air Chief of the 1st Fleet, had ordered systematic organization of the *kamikaze* attacks.

The offensive was begun on 25 October, during American landing operations on the Philippine coasts. The surprise factor was realized and losses were severe. The escort carrier, *Saint-Lô*, which was struck first, keeled over and sank off the coast of Samar while the *Gambier-Bay* of the same type, was bombed and sunk during the confusion caused by the attack. A little later, the Carrier *Princeton* suffered the same fate. During the course of the day, seven other escorting carriers whose mission was to cover the landing operations suffered serious damage.

These results were encouraging to the Japanese. Of three groups of escorting carriers used by Americans, one had to withdraw from combat and one of the others was reduced to half-strength. The commander of Task Force 58 had been obliged to dispatch hurriedly some of his combat carriers to the scene to support the landing operation. This intervention was decisive, however. From 26 October on, mass counterattacks disorganized all the Philippine airdromes, and the Japanese performance of 25 October could not be repeated.

Nevertheless, the idea had made its impression, and the air formations based in Formosa adopted the new tactics. During the course of the landing operations on Mindoro and Luzon (December 1944, January 1945), four large combat carriers, (*Franklin, Intrepid, Essex* and *Ticonderoga*), three light carriers (*Belleau-Wood, Cabot* and *Langley*), as well as six escorting carriers, had suffered various degrees of damage as the result of *kamikaze* attacks. All told, during these attacks, one pilot out of every six had attained his objective.

The proportion was satisfactory to the Japanese, since it assured the destruction or damage of one combat vessel at the minimum cost of six planes. The morale effect of this success was enormous. Hope returned to the hearts of the Japanese who could once again flatter themselves that they possessed enough airplanes to hold the American fleet in check. A great wave of enthusiasm swept the country and volunteers presented themselves *en masse*.

Not desiring to lag in heroism, the army also organized *kamikaze* units, while several special schools opened in Japan to give volunteers the short training for the brief mission they were expected to accomplish. No instruction in navigation was necessary, as the planes were to take off in groups of five under the guidance of a leader. Strong fighter protection covered the group until they were ready to head for their targests and, in case they encountered enemy fighters, the order was to avoid combat. During the main attack, the enemy's attention was to be drawn away by ordinary attacks in horizontal flight or semi-divebombing. Aircraft carriers generally served as targets, which reduced the difficulty of attack. Pilots had orders to crash on the flying deck, coming in from behind. The possibility of evasion was thus reduced.

The hour selected for attacks was usually dawn or dusk, but later some of the pilots were trained for night attacks. Tactics were simple: start at an altitude of 3,000 meters, descend to 500 meters when the target was sighted, and then dive at an angle of 45 degrees onto the target.

From fifty to one hundred hours of flying sufficed to train a *kamikaze* pilot, provided his morale was sound. Hence, during the short training period, effort was made to bolster the morale of the students by prayer and meditation. They were author-

ized to take with them, in their planes, the fruit of their meditations in the form of paper pennants covered with prayers written with their own hands. Many of these pennants were found scattered over the decks of the American vessels that escaped being set on fire.

In this moral preparation there was nothing savoring of deceit or insincerity. It was training for strengthening of the will. The precepts of Bushido, a sort of of military code of honor, taught the Japanese that death in battle is most to be preferred, and that this sort of death should be sought, since it insures certain compensations in the hereafter. It was due to this mental state of calm certainty that the *kamikaze* plan was able to attain its greatest development.

During the first months of 1945, while the Americans were consolidating their conquests, these special units were distributed among conveniently situated airdromes on Shikoku, Kyushu and in southwest and central Honshu. During the American attack on Iwo Jima, the distance was too great for large scale attacks. There were only twenty-four attempts, during which, however, the old carrier *Saratoga* and the escort carrier, *Lunga-Point* were damaged.

When the Americans undertook the decisive bound to Okinawa, the entire organization went into action. Nineteen hundred planes participated in the operation: 1,050 planes belonging to the navy, 600 belonging to the army based on Kyushu, and 200 army and fifty naval planes based on Formosa.

The first planes sent cut were naval fighters and dive bombers. The necessity for saving some of these planes for protection and normal attacks led to the employment of training planes and even hydroplanes. The poor effectiveness of these latter was no doubt compensated for by improved tactical ability, for the percentage of hits remained in the neighborhood of twenty, in spite of the development of American defense.

The latter was based on the fact that in order to reach the landing fleet, the Japanese planes had to travel 450 miles, which prevented them from varying their attack route to any great extent. The American naval commander decided, therefore, to employ a large number of his escorting destroyers to establish an almost continual chain over the flight route of the Japanese planes. This chain was charged not only with the task of maintaining an advanced radar watch but also direct antiaircraft attack. For this purpose, the majority of the destroyers had received a supplementary armament of quadruple 40-mm guns and individual radars, and the shells of their main artillery had been provided with the latest invention: the radar fuze, set off by reflected radio waves on approaching its target.

The effect of this chain was such that many *kamikaze* planes had to be turned aside from their original targets and directed against the destroyers. Some ten of them were sunk and about sixty damaged during the course of these fights.

The task forces also had been reinforced by an increased number of cruisers equipped with formidable antiaircraft artillery which, thanks to the latest improvements, had been made five times as effective as formerly. Thus it was at Okinawa that the cruiser *Guam* was able to bring down eighty-two *kamikaze* in half an hour.

In spite of this progress in defense, from 6 April to 22 June 1945, twenty-six vessels of the Pacific Fleet were sunk and 164 damaged by *kamikaze* attacks. An important result, however, was obtained by these American tactics. The carrier fleet suffered little damage.

Three combat carriers (*Bunker Hill*, *Hancock*, and *Intrepid*), and the old *Enterprise* had been hit, but none was seriously damaged. Only two escort carriers suffered slight damage.

Pounding of the airdromes from which the attacks started was carried on incessantly, and as the B-29s were able to bomb the Japanese aircraft factories daily, the "divine wind" diminished rapidly in violence.

Nevertheless, the entire national strength was being exerted to meet the supreme attack, and though the darkest pessimism might have reached the highest circles, it had not yet reached the combatants. Each was determined to fight to the last, and the *kamikaze* tactics became an integral part of the plan of defense. Everything that remained of Japanese aviation was put in reserve to counter the invasion.

After 1 July, no more flights were authorized. The planes were skillfully dispersed throughout the islands and camouflaged in such a manner that it became almost impossible to attack them on the ground. The navy still had 5,200 planes of all types. Two thousand five hundred of them, 500 combat and 2,000 training planes, were set aside as *kamikaze* planes with the following distribution:

Five-hundred each in Kyushu, Southwestern Honshu, Central Honshu, and Tokyo; 300 on Hokkaido; and 200 on Shikoku.

The army, for its part, made an effort to put into the line a nearly equal number of planes, and worked actively on a new form of tactics employing "airborne suicide troops" or "suicide paratroops."

These tactics had been tried out, with a certain degree of success, against the Yutan airdrome on Okinawa on 24 May 1945, and early in August, a large scale operation was prepared on Hokkaido for a massed suicide attack on the B-29 bases in the Marianas. American aviation, however, noted this concentration of planes in time, and a raid executed on 9 and 10 August against the airdrome of the northern zone nipped this desperate attempt in the bud.

In spite of all this, the *kamikaze* was not entirely out of the picture when the destruction of Hiroshima put an end to Japanese resistance.

The 2,500 planes belonging to the navy were ready to swoop down from all corners of the horizon on the landing craft. Their intervention was planned for the critical period following the landing of the "beach commandos" and it would have been followed by a continuous dropping of parachute troops on the forces which had landed. It is difficult to imagine what would have followed. It was doubtless for this threat that the people of Hiroshima paid with their lives.

Until the day when we have positive assurance that war has been permanently abolished, we must not jeopardize our security by failing to provide our own safeguards.

Admiral Chester W. Nimitz